TA-2244
TA-2240

ISO

Set using ISO screws

General Export Model

TA-2240

SONY
QUADRADIAL STEREO
PREAMPLIFIER 2244

TA-2244

SONY

SERVICE MANUAL

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SECTION 1
TECHNICAL DESCRIPTION

1-1. TECHNICAL SPECIFICATIONS

Technical specifications for the TA-2244 are given in Table 1-1.

TABLE 1-1. TECHNICAL SPECIFICATIONS

Harmonic distortion:		Less than 0.1% at rated output, (AUX output, 1 kHz, TONE controls flat)
IM distortion: 60 Hz:7 kHz = 4:1		Less than 0.2% at rated output (AUX output, TONE controls flat)
Input sensitivity and impedance:	PHONO-1: PHONO-2:	2 mV 47 k ohms
	TUNER AUX-1, 2 QUAD-1, 2 TAPE REC/PB	150 mV 100k ohms
Output voltage and impedance (with rated input):	FRONT OUT: REAR OUT:	1 V 10k ohms
	REC OUT:	150 mV 10k ohms (max. 9V)
	DELAY OUT:	150 mV 2k ohms
	REC/PB OUT:	30 mV 80k ohms (max. 1.9V)
	HEADPHONE OUT:	100 mV 8 ohms (at 8 ohms load)
Signal to noise ratio:	PHONO-1, 2:	greater than 70 dB (weighting network "B")
	TUNER, AUX TAPE QUAD-1, 2	greater than 90 dB (weighting network "A")
Frequency response:	PHONO-1, 2:	RIAA curve ±0.5 dB
	TUNER, AUX TAPE, REC/PB	10 Hz to 100 kHz $\pm^{0}_{2}$ dB
TONE controls:	BASS:	±10 dB at 100 Hz
	TREBLE:	±10 dB at 10 kHz

General

Power consumption:	Approx. 13 watts
Power requirement:	100, 117, 220, 240 volts, 50/60 Hz ac
Dimensions:	400 mm (width) × 149 mm (height) × 327 mm (depth) 15 3/4" (width) × 5 7/8" (height) × 12 7/8" (depth)
Net weight:	8 kg (17 lb 10 oz)
Shipping weight:	11.2 kg (24 lb 11 oz))

1-2. DETAILED CIRCUIT ANALYSIS

The following describes the function or operation of all stages and controls. The text sequence follows signal paths. Stages are listed by transistor reference designation at the left margin; major components are also listed in a similar manner. Refer to the block diagram on page 5 and the schematic diagram on page 21 to 22.

Stage/Control	*Function*
Preamplifier Section	
Equalizer/ Preamplifier Q101, Q102	This direct-coupled two-stage amplifier amplifies the small signal produced by the tuner, phono cartridge, tape recorder, or signal applied to the AUX input jacks, to the level required at the input of the following tone-control buffer amplifier.
Bias circuit	Dc bias voltage for Q101 is extracted from R108 in the emitter circuit of Q102 and applied to the base of Q101 through R103. This dc nagative-feedback technique provides stable operation during temperature changes.
Equalization circuit	RIAA equalization is achieved by the negative-feedback loop containing R112, R111, R104, C106 and C107 when the FUNCTION switch is set to PHONO. R113 (8.2k) in the output circuit prevents interaction between left and right channel-equalization when the MODE switch is set to L + R.
MODE switch S4	In the STEREO position of S4 left and right input signals are routed to their respective amplifiers. In the L + R position, the left and right

Stage/Control	*Function*
	signals are added and the sum is then fed to both amplifier channels. A rotary switch having two sections is used to obtain L + R signal even if the MONITOR switch is set to the TAPE position. Note that MODE switch has no effect upon QUAD-1 or QUAD-2 function.
FUNCTION (1), (2) switch S1, S2	Selects the desired program sources. The relation between the positions of the FUNCTION and another switches and the outputs of the set are summarized in Table 1-2. Note that the MONITOR switch is set to SOURCE, and MODE switch is set to STEREO.
Tone-amplifier Q103, 104	This direct-coupled two-stage amplifier has basically flat response, but it operates as a negative-feedback type tone-control circuit. The output generated at the collector circuit of Q104 is fed back to the emitter circuit of Q103 through the treble and bass tone-control network.
TREBLE control R131	Increases or decreases the amount of negative-feedback voltage determined by the setting of R131. It has a range of ±10 dB at 10 kHz.
BASS control R133	Similar to the treble control except for filter components and frequency characteristics. However, in this circuit the negative-feedback voltage is

TABLE 1-2.

INPUTS	FUNCTION (2)	FUNCTION (1)	FRONT OUT	REC OUT	QUAD FUNCTION	REAR OUT	DELAY OUT
TUNER or PHONO-1	TUNER or PHONO-1	any position	tuner or phono-1	tuner or phono-1	REAR OFF	---------	-------
					DELAY	delayed tuner or phono-1	delayed tuner or phono-1
					QUAD	tuner or phono-1	delayed tuner or phono-1
PHONO-2 or AUX	FUNCTION (1)	PHONO-2 or AUX	phono-2 or aux	phono-2 or aux	REAR OFF	-------	------
					DELAY	delayed phono-2 or aux	delayed phono-2 or aux
					QUAD	phono-2 or aux	delayed phono-2 or aux
QUAD-1 or QUAD-2	FUNCTION (1)	QUAD-1 or QUAD-2	quad-1 or (front) quad-2 (front)	quad-1 or (front) quad-2 (front)	REAR OFF	------	------
					DELAY	delayed quad-1 or (rear) quad-2 (rear)	delayed quad-1 or (rear) quad-2 (rear)
					QUAD	quad-1 or (rear) quad-2 (rear)	quad-1 or (rear) quad-2 (rear)

Note: MONITOR Switch should be set to SOURCE position.

Stage/Control	*Function*
	determined by the setting of R133. This has a range of ±10 dB at 100 Hz.
Tone amplifier Q301, Q302	Same as described in front tone amplifier except for reference numbers.
TREBLE control R315 BASS control R318	Note that the input signal level for this amplifier is determined by both the REAR LEVEL control (R301) and main VOLUME control (R137).
HEADPHONE switch S6	The outputs from each front and rear tone amplifiers are connected to S6, which selects desired signals for the headphone.
Headphone amplifier Q105	This is a conventional emitter follower which supplies power to drive the headphone through transformer T2 in its emitter circuit. As the emitter follower provides high input and low output impedance, it provides the proper power gain for monitoring. T2 is employed to match the impedances between the 8-ohm headphone and this amplifier.
Buffer amplifier Q501, Q502	These emitter followers are inserted between each REAR LEVEL control and the power amplifier driving the delay unit to eliminate left and right channel mutual interference. The outputs of these amplifiers are added (monaurally) and fed to the following power amplifier.
Power amplifier	Supplies enough power to drive the speaker in the delay unit.
Preamplifier Q503	Q503 is a preamplifier which amplifies an input signal to the level required at the following driver stage.
Driver Q504	Though this stage is a conventional flat amplifier, it determines the output voltage swings because the following stage is basically an emitter-follower. The ac load resistor for this stage is R533 (4.7k).
Reverberation adj.	Controls the reverberation response by increasing or decreasing the reverberated sound fed back through the delay unit and MIC amplifier.
Dc bias supply (idling current) and thermal compensator D3, D4	D3 and D4 in the collector circuit of Q504 act as a small resistances providing the necessary forward bias on the following complementary stage. In addition, the negative temperature coefficient of these diodes provides the thermal compensation for the complementary circuit.
Power amplifiers (complementary) stage Q505, Q506	These transistors operate as emitter-followers to provide the current swings required and also perform the necessary phase inversion to drive the load in push-pull. Phase inversion is performed by using PNP and NPN type transistors. Q505 supplies power during positive-going half cycles, while Q506 supplies power during negative-going half cycles.
Delay Unit Section	The delay unit makes use of the delay produced in sound waves traveling through 5 m (17 feet), 10 m (33 feet) and 15 m (50 feet) of air pipe. Refering to Fig. 1-1, the input signal is applied to the power amplifier which drives the speaker in the delay unit. The reverberated sound is picked up by SONY ELECTRET condenser microphones fixed at specified places in the air pipe. The microphone's output is amplified, mixed and fed back to the input of the power amplifier to obtain the proper reverbration response.

Stage/Control	*Function*
Dc bias supply D5, C623	Zener diode D5 supplies the specified dc bias voltage for the ELECTRET microphones. C623 reduces ripple voltage.
MIC Amplifier Q603, Q604	This direct-coupled two-stage amplifier amplifies the small 15 millisecond-delayed signal produced by ELECTRET condenser microphone EMC-1 in the delay unit, to the level required at the DELAY OUTPUT terminal. Dc bias voltage for Q603 is extracted from R619 in the emitter circuit of Q604 and applied to the base of Q603 through R613 (910k). Note that this amplifier has a basically flat response. The MIC amplifiers for the other ELECTRET condenser microphones (EMC-2, EMC-3) are the same except for reference numbers and frequency response; they compensate for high-frequency loss in the air pipe. Each MIC amplifier's output is fed to low-pass filter/buffer amplifier Q507 through each LEVEL control (R633, R634 and R632 respectively).
Low-pass filter/ buffer amplifier Q507	This stage serves two functions. It eliminates unwanted high-frequency components or the noise produced in the delay unit, and supplies delayed signal to the DELAY OUT terminal. The RC network for the low-pass filter is composed of C508, R518, and C509.
R523 (reverberation adj.)	This stage supplies feed back signal through R523 (100k) (reverberation adj) to the input of the power amplifier driving the delay unit.
Power supply	Dc output from rectifier D1 is filtered by C702 and applied to series regulator Q702. Q704 compares a sample of the output voltage picked off across R705 with reference voltage supplied by zener diode D2. A change in output voltage is detected at the base of Q704 and therefore alters its collector voltage. Since the collector of Q704 is directly coupled to the base of Q703, the change in output voltage alters the conduction of Q702 and Q703 by the amount necessary to maintain the output voltage constant. An increase in output voltage causes an increase in the impedance (decrease in conduction) of Q702 and vice versa. The dc output voltage supplied to each section is therefore extremely stable.

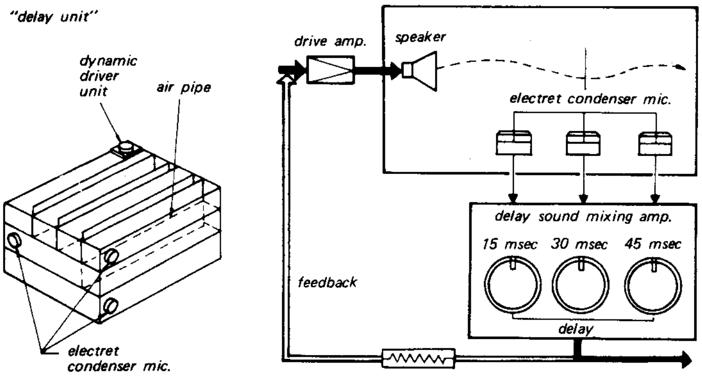
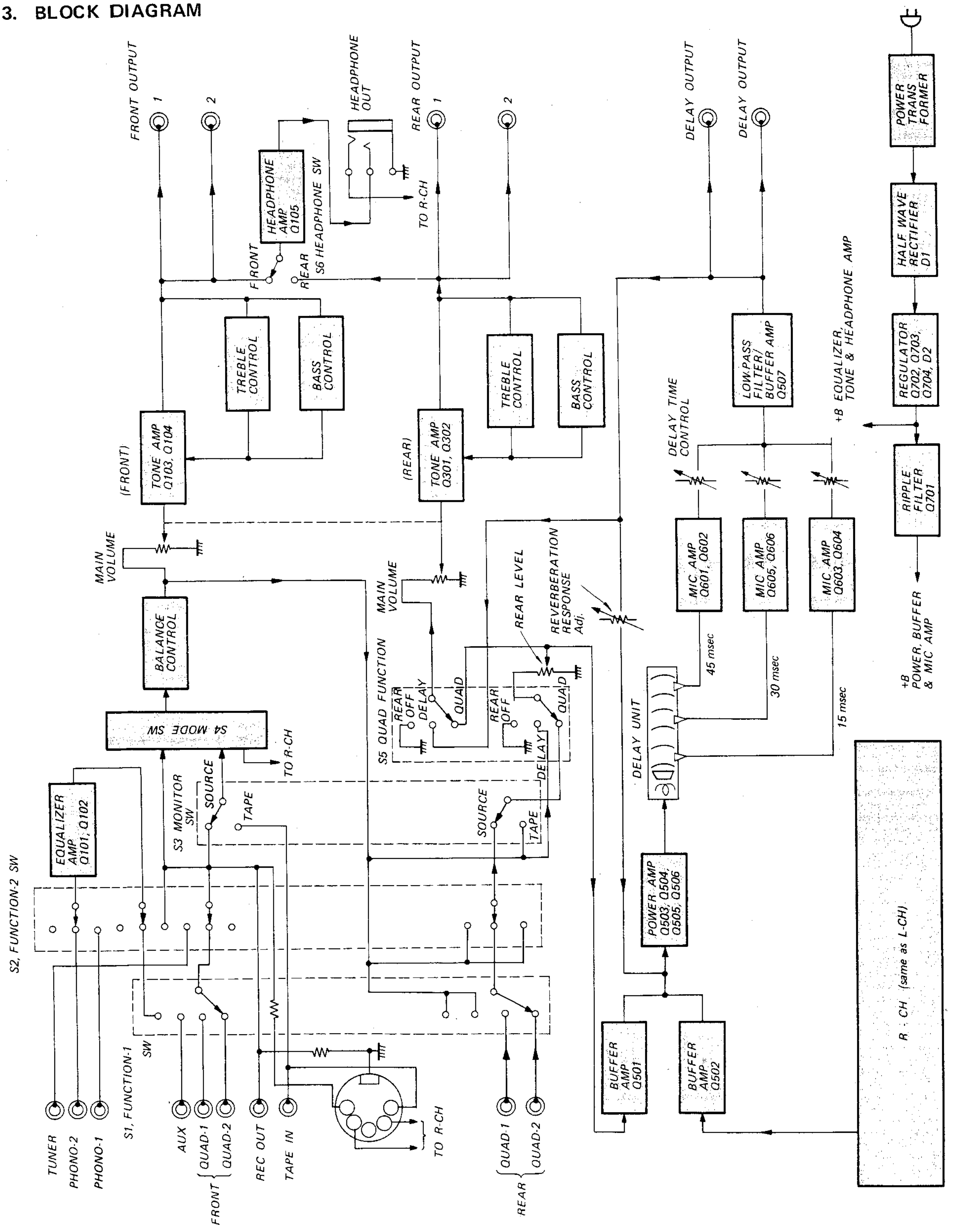


Fig. 1-1. Detail of delay unit

Ripple filter Q701, R707, R708, C703	These components reduce the ripple voltages in the dc power supply for the headphone amplifier to an extremely low value. Q701 serves as a large electronic filter to supply well-filtered dc of about 48V.

1-3. BLOCK DIAGRAM


FRONT OUTPUT 1
2
HEADPHONE OUT
HEADPHONE AMP Q105
FRONT
REAR
S6 HEADPHONE SW
TO R-CH
REAR OUTPUT 1
2
DELAY OUTPUT
DELAY OUTPUT
POWER TRANSFORMER
HALF WAVE RECTIFIER D1
REGULATOR Q702, Q703, Q704, D2
+B EQUALIZER, TONE & HEADPHONE AMP
RIPPLE FILTER Q701
+B POWER, BUFFER & MIC AMP
TREBLE CONTROL
BASS CONTROL
TONE AMP Q103, Q104
(FRONT)
TREBLE CONTROL
BASS CONTROL
TONE AMP Q301, Q302
(REAR)
LOW-PASS FILTER/ BUFFER AMP Q507
DELAY TIME CONTROL
MIC AMP Q601, Q602
MIC AMP Q605, Q606
MIC AMP Q603, Q604
45 msec
30 msec
15 msec
DELAY UNIT
MAIN VOLUME
MAIN VOLUME
REAR LEVEL
REVERBERATION RESPONSE Adj.
BALANCE CONTROL
S4 MODE SW
TO R-CH
S5 QUAD FUNCTION
REAR OFF
DELAY
QUAD
REAR OFF
DELAY
QUAD
S3 MONITOR SW
SOURCE
TAPE
SOURCE
TAPE
EQUALIZER AMP Q101, Q102
S2, FUNCTION-2 SW
S1, FUNCTION-1 SW
POWER AMP Q503, Q504, Q505, Q506
BUFFER AMP Q501
BUFFER AMP Q502
R-CH (same as L-CH)
TUNER
PHONO-2
PHONO-1
AUX
QUAD-1
QUAD-2
FRONT
REC OUT
TAPE IN
TO R-CH
QUAD-1
QUAD-2
REAR

SECTION 2

DISASSEMBLY AND REPLACEMENT PROCEDURES

WARNING

Unplug the ac power cord before starting any disassembly or replacement procedures.

2-1. TOOLS REQUIRED

The following tools are required to perform disassembly and replacement procedures on the TA-2244.

1. Screwdriver, Phillips-head
2. Screwdriver, 3 mm (1/8") blade
3. Pliers, long-nose
4. Diagonal cutters
5. Wrench, adjustable
6. Tweezers
7. Electric drill
8. Drill bits
9. Prick punch
10. Hammer, ball-peen
11. Soldering iron, 40 to 50 watts
12. Solder, rosin core
13. Cement solvent
14. Cement, contact

2-2. HARDWARE IDENTIFICATION GUIDE

The following chart will help you to decipher the hardware codes given in this service manual.

NOTE: All screws in this set are manufactured to the specifications of the International Organization for Standardization (ISO). This means that the new and old screws are not interchangeable because ISO screws have a different number of threads per mm compared to the old ones. The ISO screws have an identification mark on their heads as shown in Fig. 2-1.

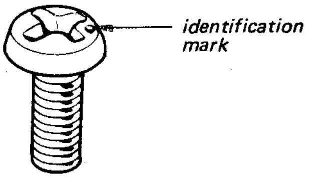
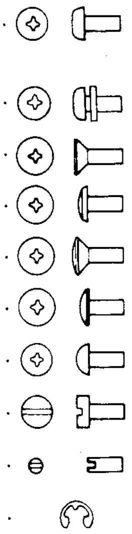


Fig. 2-1. ISO screw

– Hardware Nomenclature –

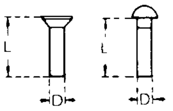
P	–	Pan Head Screw
PS	–	Pan Head Screw with Spring Washer
K	–	Flat Countersunk Head Screw
B	–	Binding Head Screw
RK	–	Oval Countersunk Head Screw
T	–	Truss Head Screw
R	–	Round Head Screw
F	–	Flat Fillister Head Screw
SC	–	Set Screw
E	–	Retaining Ring (E Washer)



W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

Type of Slot
⊕ P 3x10
Length in mm (L)
Diameter in mm (D)
Type of Head



2-3. TOP COVER AND FRONT PANEL REMOVAL

1. Remove the two machine screws at each side of the case, and lift off the top cover.
2. Remove all control knobs and levers. The knobs can be removed by loosening the slotted set screws and pulling the knobs straight out. The lever knobs are simply pulled off.
3. Remove the three screws (⊕ PSW 4x6) behind the top edge of the front subchassis as shown in Fig. 2-2.
4. Remove the three self-tapping screws (⊕ B 3x6) at the front bottom of the chassis as shown in Fig. 2-3. This frees the front panel.

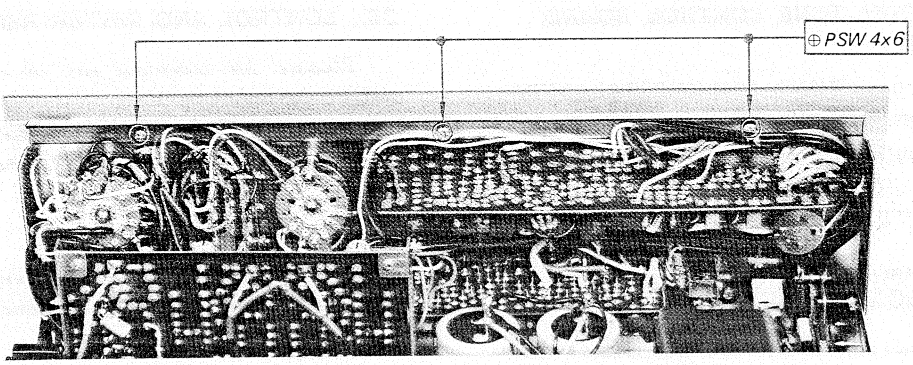


Fig. 2-2. Front panel removal

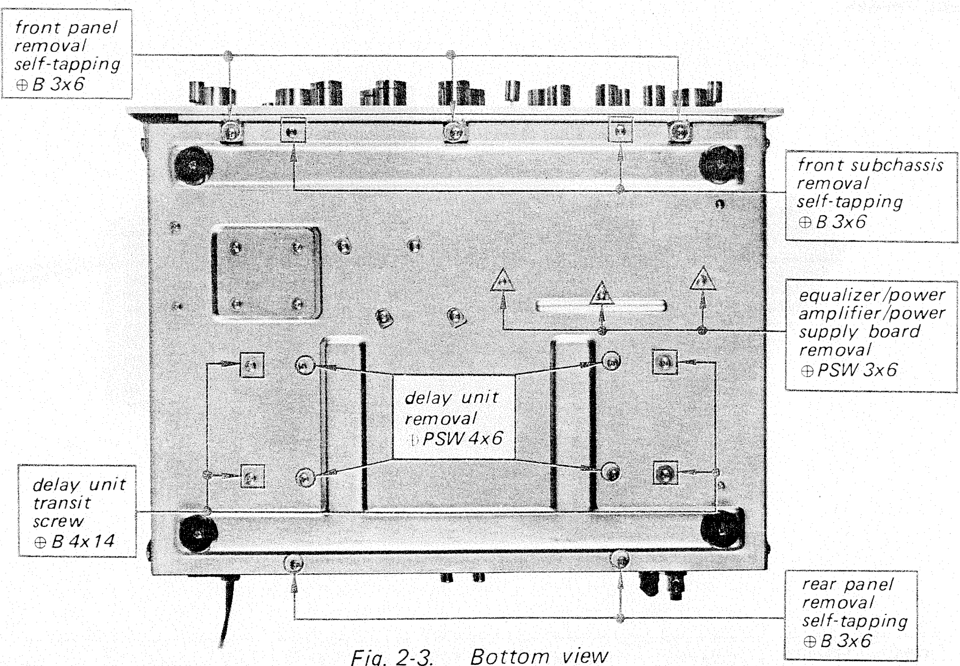

front panel removal self-tapping ⊕B 3x6
front subchassis removal self-tapping ⊕B 3x6
equalizer/power amplifier/power supply board removal ⊕PSW 3x6
delay unit removal ⊕PSW 4x6
delay unit transit screw ⊕B 4x14
rear panel removal self-tapping ⊕B 3x6

Fig. 2-3. Bottom view

2-4. FRONT SUBCHASSIS REMOVAL

The front subchassis is the vertical member on which the switches and controls are attached.

1. Remove the top cover and front panel as described in Procedure 2-3.
2. Remove the two self-tapping screws (⊕B 3x6) at each side of the front subchassis and two self-tapping screws (⊕B 3x6) at the front bottom of the chassis as shown in Fig. 2-3. This frees the front subchassis as shown in Fig. 2-4.

2-5. FRONT VOLUME/BALANCE/TONE CONTROL BOARD REMOVAL

1. Remove the top cover and front panel as described in Procedure 2-3.
2. Remove the hex nuts that secure the VOLUME, BALANCE and TONE CONTROLS to the front subchassis as shown in Fig. 2-5. This frees the control board.

2-6. REAR LEVEL/TONE CONTROL BOARD REMOVAL

1. Remove the FRONT VOLUME/BALANCE/TONE CONTROL board first, and then remove the hex nuts that secure the REAR LEVEL and TONE controls to the front subchassis as shown in Fig. 2-5.

2-7. EQUALIZER/POWER AMPLIFIER/POWER SUPPLY BOARD REMOVAL

1. Remove the top cover, and then remove the three screws (⊕PSW 3×6) from the bottom securing the mounting bracket to the chassis as shown in Fig. 2-3. This free the board and mounting bracket.

2-8. CONTROL AND SWITCH REPLACEMENT

Prepare for replacing any of the controls or switches by removing the front subchassis, VOLUME/BALANCE/FRONT TONE CONTROL board or REAR TONE CONTROL board as described in Procedures 2-5 and 2-6.

POWER, HEADPHONE, FUNCTION (2), QUAD FUNCTION and MONITOR Switches

1. Remove the two screws (⊕PS 3×6) securing switches to the front subchassis as shown in Fig. 2-5.

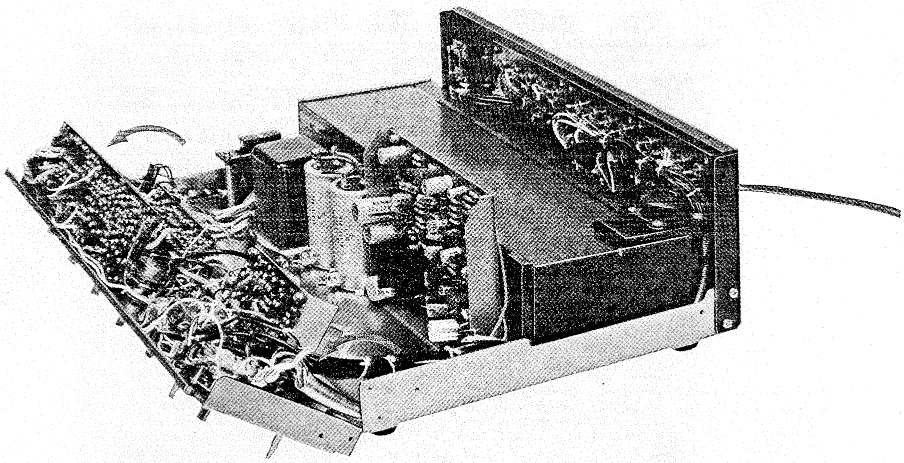


Fig. 2-4. Front subchassis removal

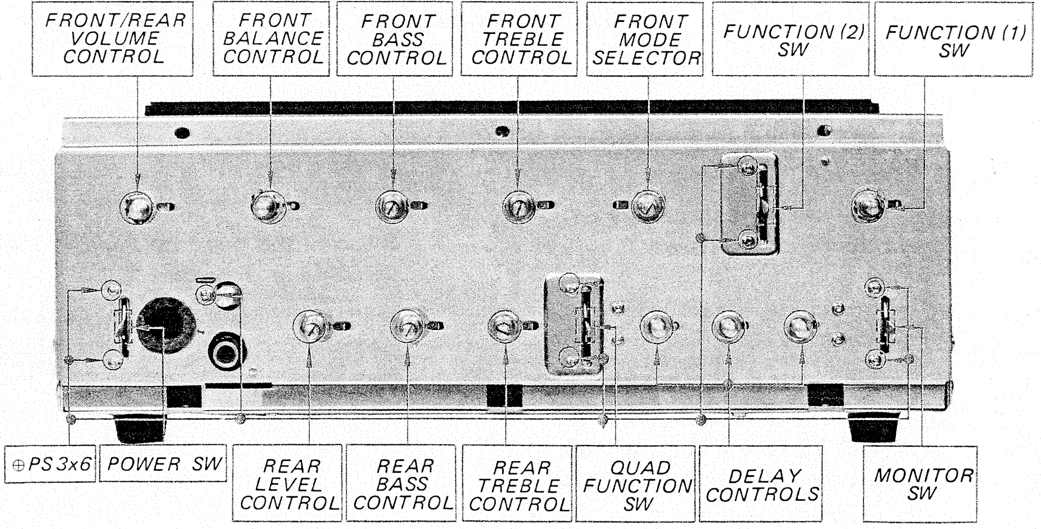

FRONT/REAR VOLUME CONTROL
FRONT BALANCE CONTROL
FRONT BASS CONTROL
FRONT TREBLE CONTROL
FRONT MODE SELECTOR
FUNCTION (2) SW
FUNCTION (1) SW
⊕PS 3x6
POWER SW
REAR LEVEL CONTROL
REAR BASS CONTROL
REAR TREBLE CONTROL
QUAD FUNCTION SW
DELAY CONTROLS
MONITOR SW

Fig. 2-5. Control and switch replacement

VOLUME, BALANCE, BASS, TREBLE, REAR LEVEL, REAR BASS, REAR TREBLE, Controls

1. With a soldering-iron having a solder-sucking tip, clean the solder from each lug of the defective control and PC board, and then install the replacement control.

FUNCTION (1), DELAY TIME Controls and MODE Switch

1. Remove the hex nut securing the switch or controls to the front subchassis.
2. Unsolder the lead wires from the defective switch or controls, and then install the new one.

2-9. PILOT LAMP REPLACEMENT

1. Remove the top cover as described in procedure 2-3.
2. Straighten the tab of the pilot-lamp holder to permit the removal of the pilot-lamp socket; then pull out the pilot-lamp socket.
3. Unscrew the lamp from the socket and install a new one. Care should be taken not to lose the black lamp shade.

2-10. DELAY UNIT REMOVAL

The delay unit is an air reverberation unit in which a driving speaker and ELECTRET condenser microphones are built in.

1. Remove the top cover as described in Procedure 2-3.
2. Remove the four screws (⊕PSW 4x6) and four transit screws (⊕B 4x14) if necessary, as shown in Fig. 2-3. This frees the delay unit.

2-11. REAR PANEL REMOVAL

1. Remove the top cover as described in Procedure 2-3.
2. Remove the four self-tapping screws (⊕B 3x6) at each sides of the rear panel and two self-tapping screw (⊕B 3x6) at the rear bottom of the chassis as shown in Fig. 2-3. This frees the rear panel as shown in Fig. 2-6.

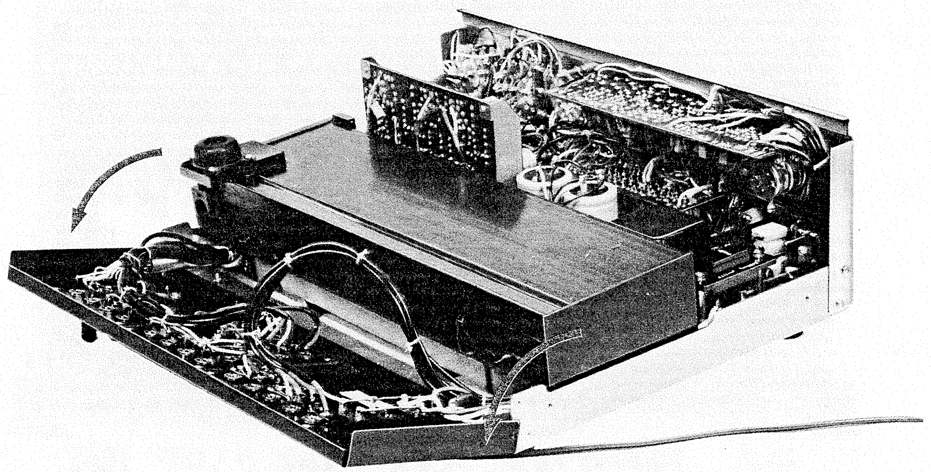


Fig. 2-6. Rear panel removal

2-12. REPLACEMENT OF COMPONENTS SECURED TO THE REAR PANEL BY RIVETS

1. Remove the rear panel as described in Procedure 2-11.
2. Bore out the rivets using a drill bit slightly larger in diameter than the rivet. See Fig. 2-7.
3. Punch out the remainder of the rivet with a nail set or prick punch.
4. Remove the defective component, and then install a new one.
5. Secure the new component with a suitable screw and nut, or a repair rivet screw (part number 3-701-402).

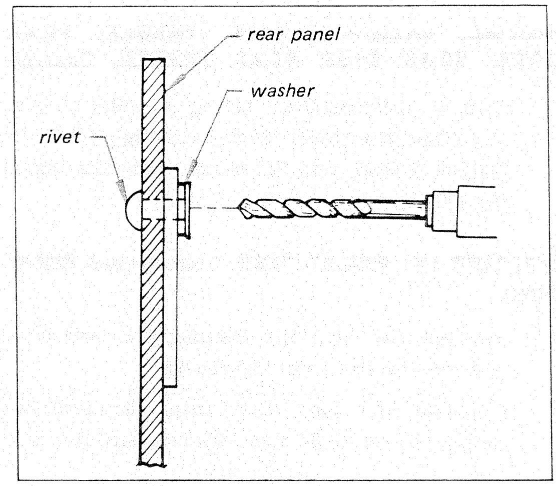
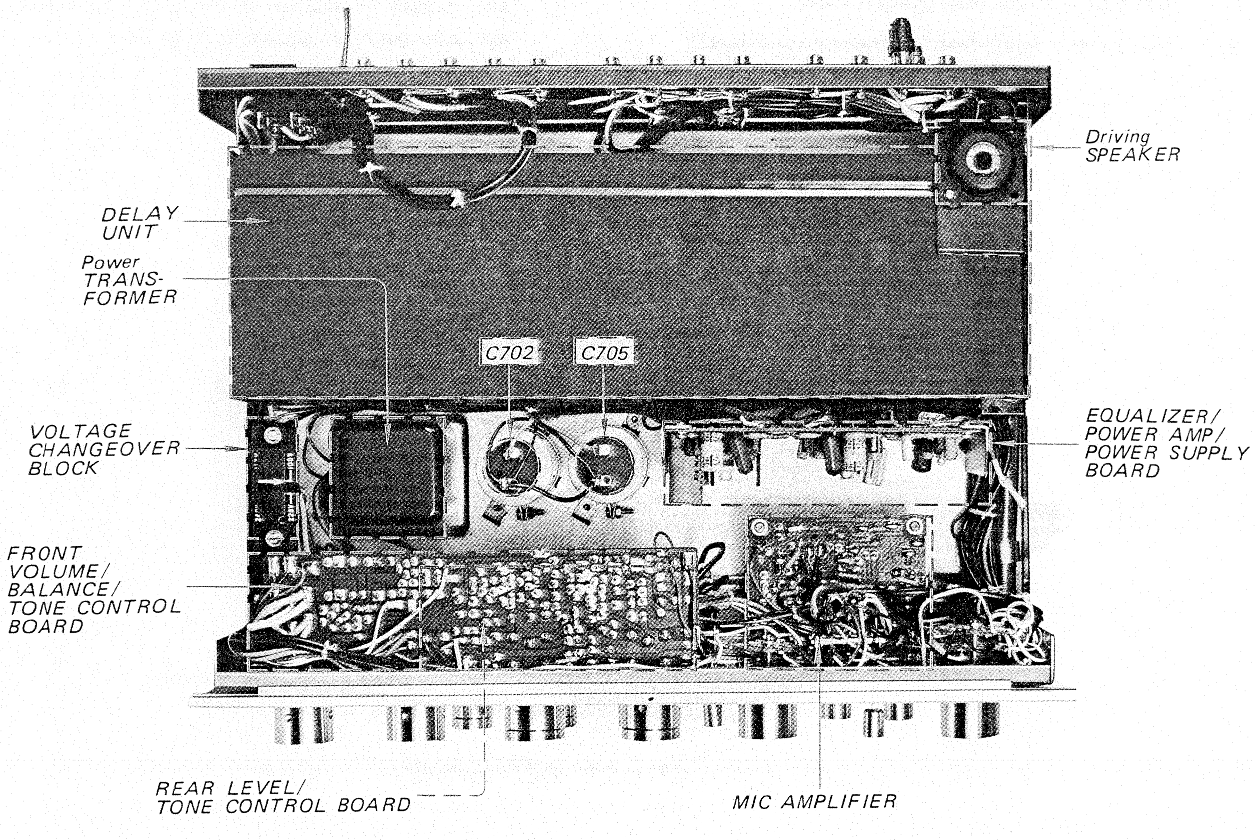

rear panel
washer
rivet

Fig. 2-7. Rivet replacement

CHASSIS LAYOUT


Driving SPEAKER
DELAY UNIT
Power TRANSFORMER
C702
C705
VOLTAGE CHANGEOVER BLOCK
EQUALIZER/ POWER AMP/ POWER SUPPLY BOARD
FRONT VOLUME/ BALANCE/ TONE CONTROL BOARD
REAR LEVEL/ TONE CONTROL BOARD
MIC AMPLIFIER

SECTION 3
OVERALL CHECKS MEASUREMENTS

3-1. TEST EQUIPMENT REQUIRED

1. **Audio Oscillator**

   Frequency range .... 10 Hz to 100 kHz
   Distortion .... 0.03% or less at 1 kHz

2. **Distortion Meter**

   Capable of measuring of 0.015% distortion or less at 1 kHz
   Frequency range .... 20 Hz to 100 kHz
   Input impedance .... 1 megohm or more

3. **Ac VTVM**

   Capable of measuring rms voltage of 100 mV or less with a frequency range from 10 Hz to 100 kHz.
   Input impedance .... 500k ohms or more

4. **Attenuator**

   Capable of attenuating signals 60 dB or more.
   Characteristic impedance .... 600 ohms unbalanced

5. **Oscilloscope**

   Bandwidth .... 1 MHz or more

***Note:** 0 dB = 0.775 V (rms)

3-2. OVERALL SENSITIVITY AND OUTPUT MEASUREMENT

Preparation

1. Set the controls and switches as follows:
   VOLUME control .... Max.
   (front)
   REAR LEVEL control .... Max.
   BALANCE control .... Center
   BASS, TREBLE control .... Center
   (front and rear)
   QUAD FUNCTION .... QUAD
   MONITOR switch .... SOURCE
2. With the equipments connected as shown in Fig. 3-1, set the audio oscillator's output to 775 mV (0 dB). Care should be taken that the audio oscillator keeps this value during the measurement.

Procedure

1. Set the FUNCTION(2) or FUNCTION(1) switch to the desired position.
2. With the equipment connected as shown in Fig. 3-1, feed a 1 kHz signal to the desired input terminal, and adjust the attenuator to obtain a 1 V (+2.2 dB) output at FRONT or REAR output terminal. The reading on the attenuator represents the sensitivity. Check the output level and sensitivity given in Table 3-1 and Table 3-2, respectively.

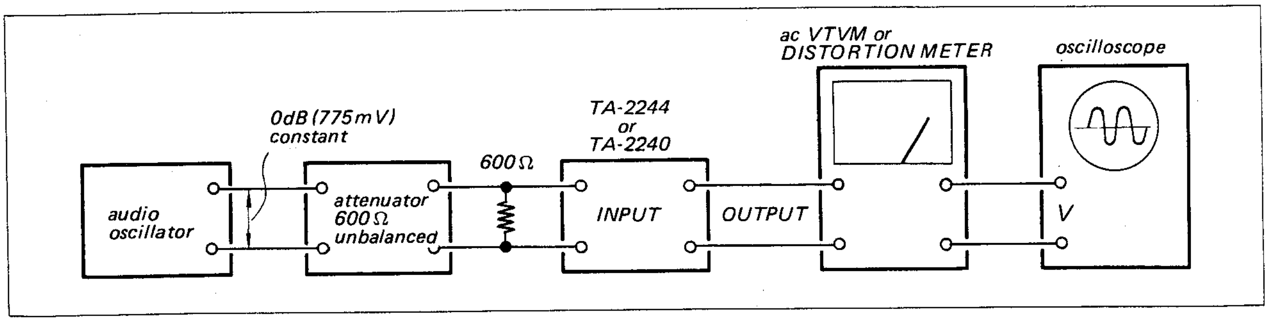


Fig. 3-1. Operational check test setup

TABLE 3-1. OUTPUT LEVEL

OUTPUT Jack	OUTPUT LEVEL
REAR OUT	2.2 dB
REC OUT	-15 ± 1 dB
HEADPHONE OUT (front) (at 8 ohms load)	-24 ± 1 dB
HEADPHONE OUT (rear)	-24 ± 1 dB
REC/PB OUT DIN connector ① or ④ to ground (see Fig. 3-2.)	-31 ± 1 dB

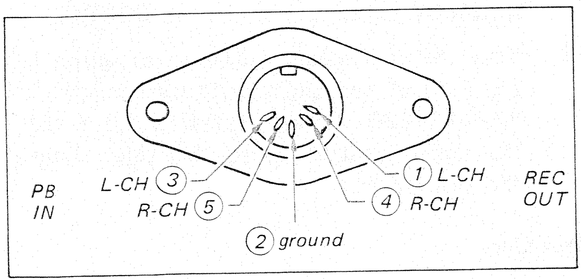

PB
IN
L-CH ③
R-CH ⑤
② ground
① L-CH
④ R-CH
REC
OUT

Fig. 3-2. DIN connector

TABLE 3-2. SENSITIVITY

INPUT	ATTENUATOR reading
PHONO-1, -2	52.5 ± 1 dB
TUNER, AUX, QUAD-1, -2	15 ± 1 dB

3-3. HARMONIC DISTORTION MEASUREMENT

Preparation

Same as described in Procedure 3-2.

Procedure

1. Set the FUNCTION(2) switch to TUNER.
2. Feed a 1 kHz signal to the TUNER input terminal, and adjust the attenuator to obtain 4V (+14.3 dB) output at FRONT and REAR output terminal.
3. Measure the harmonic distortion. Harmonic distortion should be 0.1% maximum.

3-4. REVERBERATION ADJUSTMENT

Preparation

1. Remove the top cover as described in Procedure 2-3.
2. Set the three delay time controls to their maximum position (fully clockwise position).

Procedure

1. With the equipment connected as shown in Fig. 3-3, adjust the controls of the oscilloscope to provide a visible indication of noise.
2. Watch the oscilloscope to confirm that there is no self-oscillation while tapping the delay unit with your hand.
3. If the self-oscillation occurs, readjust the position of semi-fixed resistor R523 (reverberation adj.) slightly until stable operation is obtained. See Fig. 3-4.

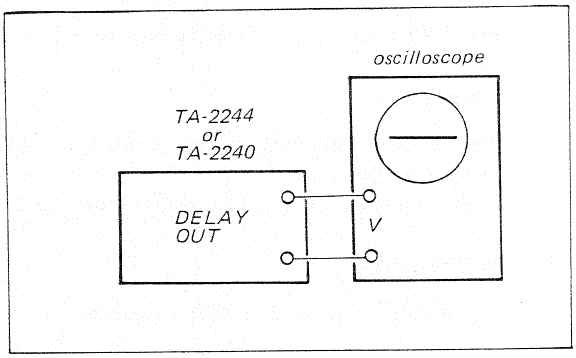

oscilloscope
TA-2244
or
TA-2240
DELAY
OUT
V

Fig. 3-3. Reverberation response adjustment test setup

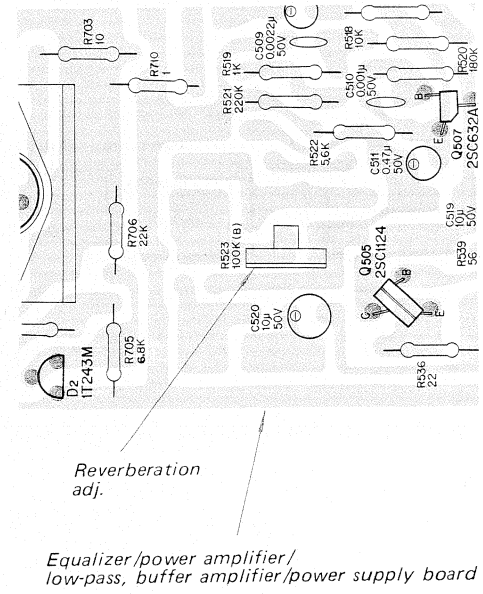

R703
10
R710
1
R519
1K
R521
220K
C509
0.0022μ
50V
R518
10K
R520
180K
C510
0.001μ
50V
R522
5.6K
C511
0.47μ
50V
B
E
Q507
2SC632A
R706
22K
R523
100K (B)
C519
10μ
50V
Q505
2SC1124
R539
56
C520
10μ
50V
G
B
E
R705
6.8K
D2
1T243M
R536
22
Reverberation
adj.
Equalizer/power amplifier/
low-pass, buffer amplifier/power supply board

Fig. 3-4. Parts location

3-5. FREQUENCY RESPONSE MEASUREMENT

Preparation

Same as described in Procedure 3-2.

Procedure

1. Set the FUNCTION(2) switch to TUNER.
2. Feed a 1 kHz, signal to the TUNER input terminal, and adjust the attenuator to obtain a 1 V (+2.2 dB) output at the FRONT output terminal.
3. Check the output level while changing the input signal frequency. The output should be within the following limits:
   10 Hz .... $2.2\pm^{0}_{3}$ dB
   100 kHz .... $2.2\pm^{0}_{3}$ dB

3-6. OVERALL CHECKS AND MEASUREMENT FOR TA-2240

1. TEST EQUIPMENT REQUIRED

Same as described in 3-1.

2. OVERALL SENSITIVITY AND OUTPUT MEASUREMENT

Preparation

a. Set the controls and switches as follows:

QUAD VOLUME control	Max.
LEVEL control	Max.
BASS, TREBLE control	Center
MODE switch	STEREO
FRONT MONITOR switch	TAPE
QUAD FUNCTION switch	QUAD

b. Same as described in 3-2, preparation step 2.

Procedure

a. With the equipment connected as shown in Fig. 3-1, feed a 1 kHz signal to the TAPE input jack, and adjust the attenuator to obtain a 1 V (2.2 dB) output at REAR OUTPUT jack. The reading on the attenuator represents the sensitivity. Sensitivity should be within 15 dB ± 1 dB. Check the output level as given in table 3-1.

3. HARMONIC DISTORTION MEASUREMENT

Preparation

Same as described in Procedure 3-2.

Procedure

a. With the equipment connected as shown in Fig. 3-1, feed a 1 kHz signal to the TAPE input terminal, and adjust the attenuator to obtain 3 V (11.8 dB) output at REAR output terminal.

b. Measure the harmonic distortion. Harmonic distortion should be maximum.

4. REVERBERATION ADJUSTMENT

Same as described in Procedure 3-3, on page 12.

5. FREQUENCY RESPONSE MEASUREMENT

Preparation

Same as described in Procedure 3-2.

Procedure

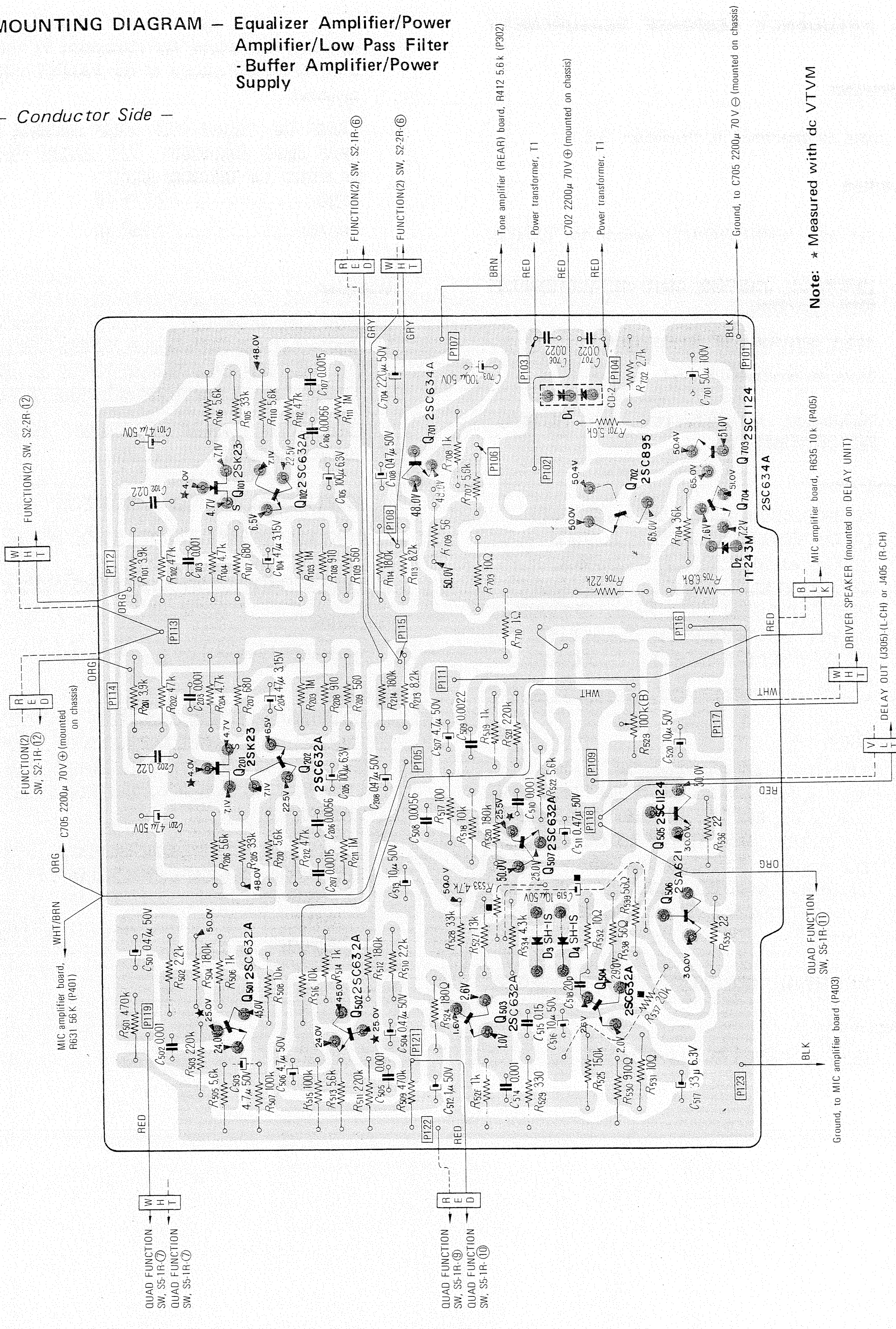
a. With the equipment connected as shown in Fig. 3-1, feed a 1 kHz signal to the TAPE input terminal, and adjust the attenuator to obtain a 1 V (2.2 dB) output at the REAR output terminal.

b. Check the output level while changing the input signal frequency. The output should be within the following limits:
   10 Hz .... $2.2\ \pm^{0}_{3}$ dB
   100 kHz .... $2.2\ \pm^{0}_{3}$ dB

SECTION 4
DIAGRAMS

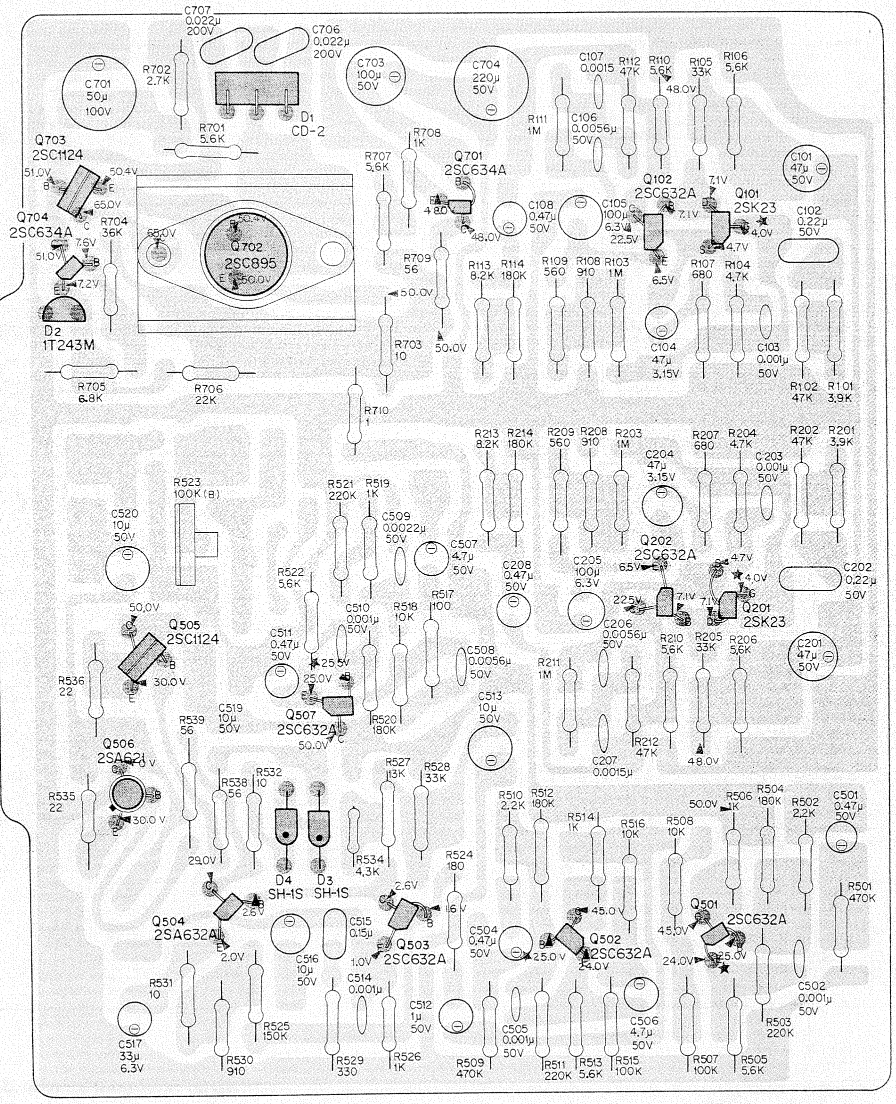
4-1. MOUNTING DIAGRAM – Equalizer Amplifier/Power Amplifier/Low Pass Filter - Buffer Amplifier/Power Supply

– Conductor Side –


FUNCTION(2) SW, S2-1R-⑥
FUNCTION(2) SW, S2-2R-⑥
Tone amplifier (REAR) board, R412 5.6 k (P302)
Power transformer, T1
C702 2200μ 70V ⊕ (mounted on chassis)
Power transformer, T1
Ground, to C705 2200μ 70 V ⊖ (mounted on chassis)
BRN
RED
RED
RED
GRY
GRY
BLK
FUNCTION(2) SW, S2-2R-⑫
FUNCTION(2) SW, S2-1R-⑫
C705 2200μ 70V ⊕ (mounted on chassis)
ORG
ORG
ORG
WHT/BRN
MIC amplifier board, R631 56K (P401)
RED
RED
QUAD FUNCTION SW, S5-1R-⑦
QUAD FUNCTION SW, S5-1R-⑦
QUAD FUNCTION SW, S5-1R-⑨
QUAD FUNCTION SW, S5-1R-⑩
MIC amplifier board, R635 10k (P405)
DRIVER SPEAKER (mounted on DELAY UNIT)
DELAY OUT (J305)(L-CH) or J405 (R-CH)
RED
WHT
RED
ORG
QUAD FUNCTION SW, S5-1R-①
BLK
Ground, to MIC amplifier board (P403)
Q101 2SK23
Q102 2SC632A
Q201 2SK23
Q202 2SC632A
Q501 2SC632A
Q502 2SC632A
Q503 2SC632A
Q504 2SC632A
Q505 2SC1124
Q506 2SA621
Q507 2SC632A
Q701 2SC634A
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D1 CD-2
D2 IT243M
D3 SH-1S
D4 SH-1S

Note: ★ Measured with dc VTVM

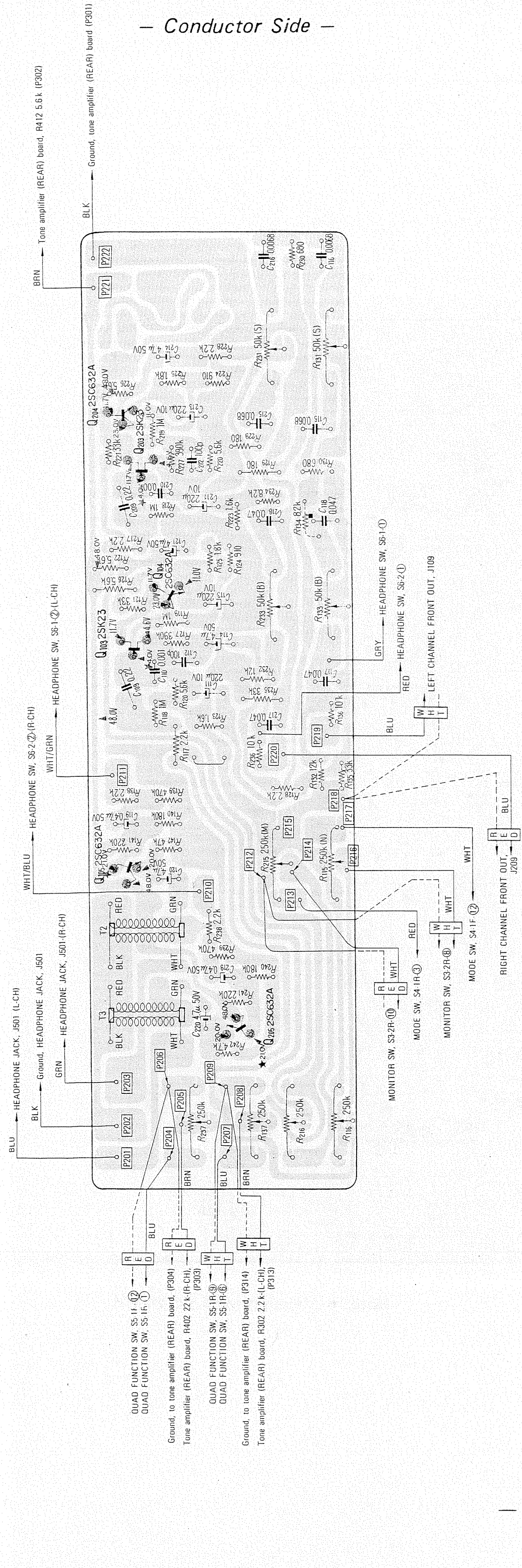
— Component Side —


C707
0.022µ
200V
C706
0.022µ
200V
C701
50µ
100V
R702
2.7K
C703
100µ
50V
C704
220µ
50V
D1
CD-2
R701
5.6K
Q703
2SC1124
51.0V
50.4V
65.0V
Q704
2SC634A
R704
36K
7.6V
51.0V
7.2V
D2
1T243M
Q702
2SC895
65.0V
50.4V
50.0V
R705
6.8K
R706
22K
R707
5.6K
R708
1K
Q701
2SC634A
48.0V
48.0V
R709
56
50.0V
R703
10
50.0V
R710
1
C107
0.0015
R112
47K
R110
5.6K
R105
33K
R106
5.6K
48.0V
R111
1M
C106
0.0056µ
50V
C101
47µ
50V
Q102
2SC632A
Q101
2SK23
7.1V
7.1V
4.0V
4.7V
C108
0.47µ
50V
C105
100µ
6.3V
22.5V
6.5V
C102
0.22µ
50V
R113
8.2K
R114
180K
R109
560
R108
910
R103
1M
R107
680
R104
4.7K
C104
47µ
3.15V
C103
0.001µ
50V
R102
47K
R101
3.9K
R213
8.2K
R214
180K
R209
560
R208
910
R203
1M
R207
680
R204
4.7K
R202
47K
R201
3.9K
C204
47µ
3.15V
C203
0.001µ
50V
R523
100K (B)
R521
220K
R519
1K
C509
0.0022µ
50V
C507
4.7µ
50V
C520
10µ
50V
R522
5.6K
C208
0.47µ
50V
C205
100µ
6.3V
Q202
2SC632A
6.5V
4.7V
4.0V
22.5V
7.1V
7.1V
Q201
2SK23
C202
0.22µ
50V
50.0V
Q505
2SC1124
30.0V
R536
22
C510
0.001µ
50V
R518
10K
R517
100
C511
0.47µ
50V
25.5V
25.0V
C508
0.0056µ
50V
C206
0.0056µ
50V
R210
5.6K
R205
33K
R206
5.6K
C201
47µ
50V
R211
1M
C519
10µ
50V
R539
56
Q507
2SC632A
50.0V
R520
180K
C513
10µ
50V
Q506
2SA621
30.0V
R212
47K
48.0V
C207
0.0015µ
R535
22
R538
56
R532
10
R527
13K
R528
33K
R510
2.2K
R512
180K
R514
1K
R516
10K
R508
10K
50.0V
R506
1K
R504
180K
R502
2.2K
C501
0.47µ
50V
29.0V
D4
SH-1S
D3
SH-1S
R534
4.3K
R524
180
2.6V
116V
Q504
2SA632A
2.6V
2.0V
C515
0.15µ
1.0V
Q503
2SC632A
C504
0.47µ
50V
25.0V
45.0V
Q502
2SC632A
24.0V
Q501
2SC632A
45.0V
24.0V
25.0V
R501
470K
C516
10µ
50V
R531
10
C514
0.001µ
C512
1µ
50V
C506
4.7µ
50V
C502
0.001µ
50V
R503
220K
C517
33µ
6.3V
R530
910
R525
150K
R529
330
R526
1K
R509
470K
C505
0.001µ
50V
R511
220K
R513
5.6K
R515
100K
R507
100K
R505
5.6K

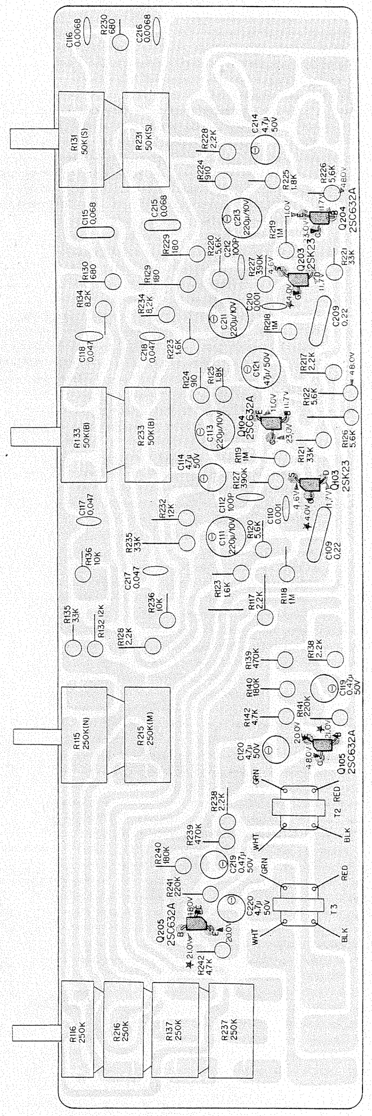
Note: ★ Measured with dc VTVM

4-2. MOUNTING DIAGRAM – FRONT TONE Amplifier/Headphone Amplifier

– Conductor Side –


Ground, tone amplifier (REAR) board (P301)
Tone amplifier (REAR) board, R412 5.6k (P302)
BRN
BLK
WHT/GRN
HEADPHONE SW, S6-1② (L-CH)
HEADPHONE SW, S6-2② (R-CH)
WHT/BLU
HEADPHONE JACK, J501 (R-CH)
HEADPHONE JACK, J501 (L-CH)
Ground, HEADPHONE JACK, J501
GRN
BLU
HEADPHONE SW, S6-1①
HEADPHONE SW, S6-2①
LEFT CHANNEL FRONT OUT, J109
RIGHT CHANNEL FRONT OUT, J209
GRY
RED
WHT
MODE SW, S4-1F ⑫
MONITOR SW, S3-2R ⑧
MODE SW, S4-1R ③
MONITOR SW, S3-2R ⑪
QUAD FUNCTION SW, S5-1F ⑫
QUAD FUNCTION SW, S5-1F ①
Ground, to tone amplifier (REAR) board, (P304)
Tone amplifier (REAR) board, R402 2.2k (R-CH), (P303)
QUAD FUNCTION SW, S5-1R ⑨
QUAD FUNCTION SW, S5-1R ⑥
Ground, to tone amplifier (REAR) board, (P314)
Tone amplifier (REAR) board, R302 2.2k (L-CH), (P313)
Q204 2SC632A
Q203 2SK23
Q104 2SC632A
Q103 2SK23
Q105 2SC632A
Q205 2SC632A
T2
T3

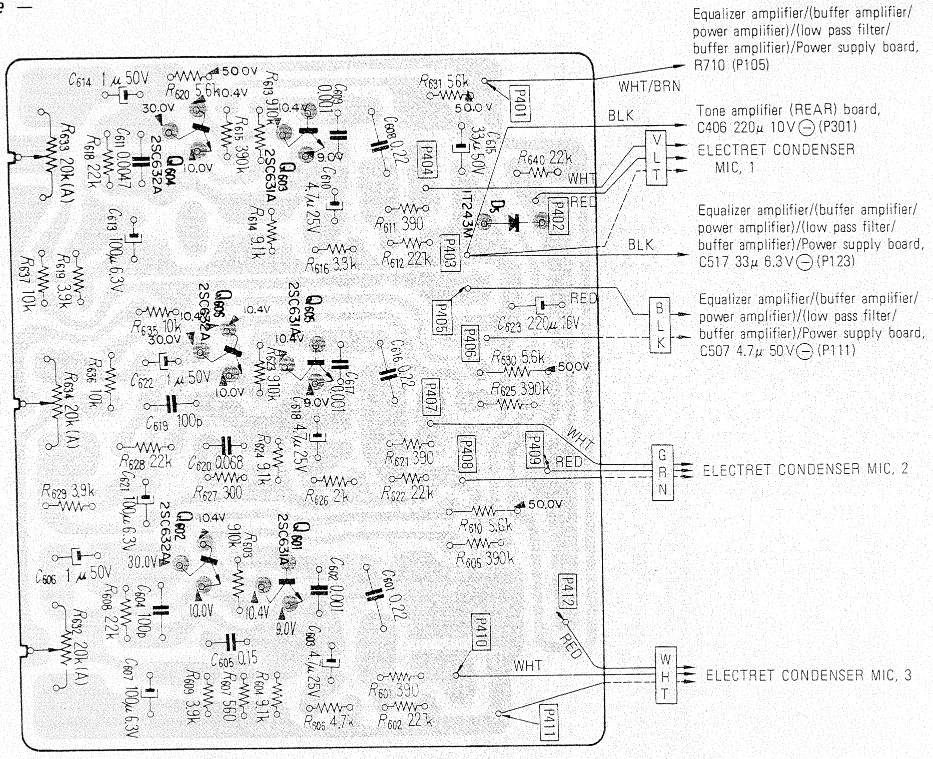
– Component Side –



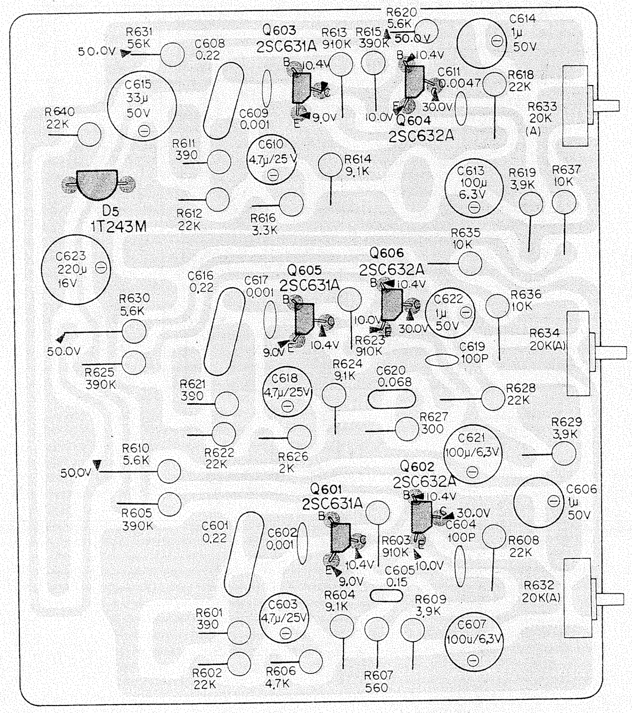
Note: ★ Measured with dc VTVM

4-3. MOUNTING DIAGRAM – MIC Amplifier

– Conductor Side –

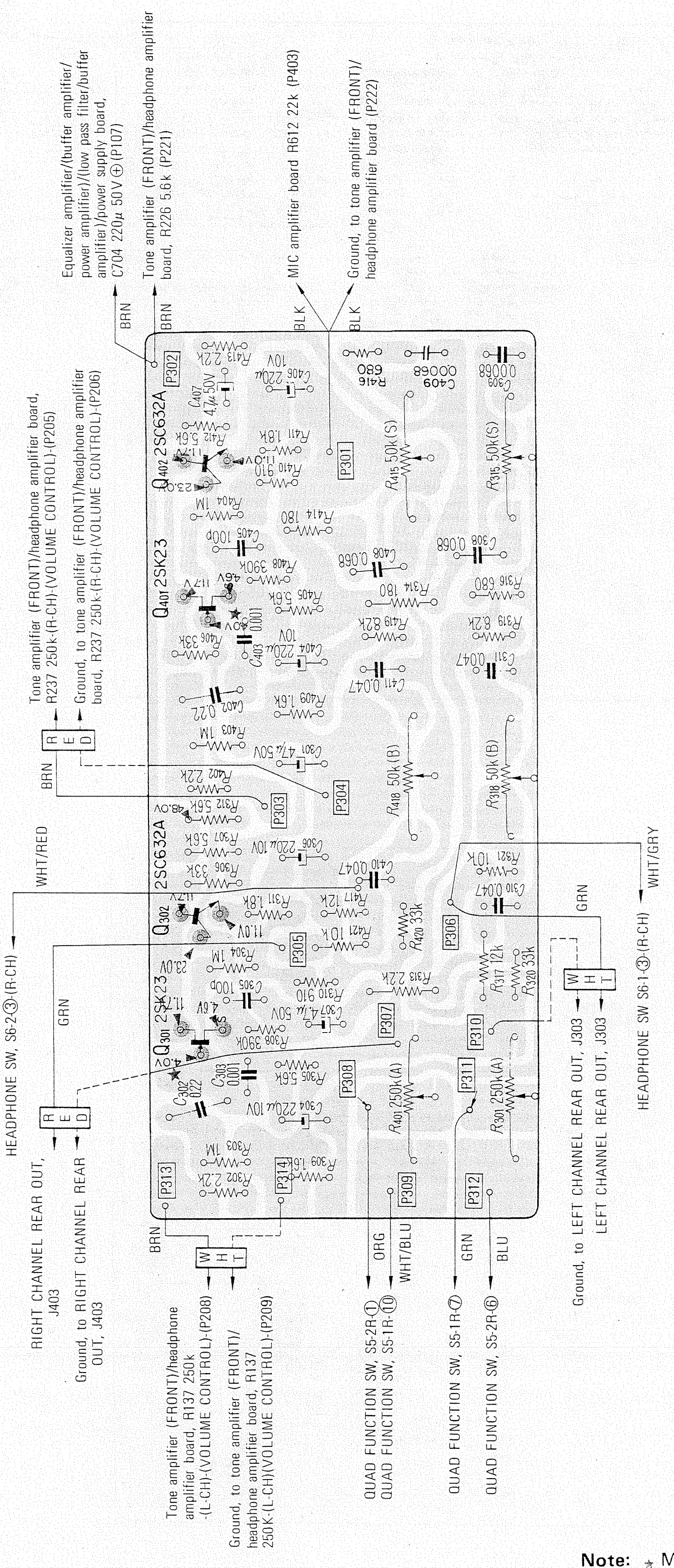

Equalizer amplifier/(buffer amplifier/ power amplifier)/(low pass filter/ buffer amplifier)/Power supply board, R710 (P105)
WHT/BRN
BLK
Tone amplifier (REAR) board, C406 220µ 10V ⊖ (P301)
V L T
ELECTRET CONDENSER MIC, 1
WHT
RED
Equalizer amplifier/(buffer amplifier/ power amplifier)/(low pass filter/ buffer amplifier)/Power supply board, C517 33µ 6.3V ⊖ (P123)
BLK
RED
B L K
Equalizer amplifier/(buffer amplifier/ power amplifier)/(low pass filter/ buffer amplifier)/Power supply board, C507 4.7µ 50V ⊖ (P111)
WHT
RED
G R N
ELECTRET CONDENSER MIC, 2
RED
WHT
W H T
ELECTRET CONDENSER MIC, 3
P401
P402
P403
P404
P405
P406
P407
P408
P409
P410
P411
P412
C614 1µ 50V
R620 5.6k
50.0V
10.4V
30.0V
R633 20k (A)
R618 22k
C611 0.0047
Q604 2SC632A
10.0V
R613 910k
R615 390k
Q603 2SC631A
C609 0.001
9.0V
C610 4.7µ 25V
R614 9.1k
C608 0.22
R631 56k
C615 33µ 50V
R640 22k
D5 1T243M
R611 390
R612 22k
R616 3.3k
C613 100µ 6.3V
R619 3.9k
R637 10k
Q606 2SC632A
R635 10k
Q605 2SC631A
C622 1µ 50V
R636 10k
R634 20k (A)
C619 100p
R623 910k
C617 0.001
C618 4.7µ 25V
C616 0.22
C623 220µ 16V
R630 5.6k
R625 390k
R628 22k
C620 0.068
R627 300
R624 9.1k
R626 2k
R621 390
R622 22k
R629 3.9k
C621 100µ 6.3V
Q602 2SC632A
C606 1µ 50V
R608 22k
R632 20k (A)
C604 100p
R603 910k
Q601 2SC631A
C602 0.001
C601 0.22
R610 5.6k
R605 390k
C605 0.15
C607 100µ 6.3V
R609 3.9k
R607 560
R604 9.1k
C603 4.7µ 25V
R606 4.7k
R601 390
R602 22k

– Component Side –


R620 5.6K
C614 1µ 50V
R631 56K
50.0V
C608 0.22
Q603 2SC631A
R613 910K
R615 390K
50.0V
10.4V
C611 0.0047
R618 22K
C615 33µ 50V
R640 22K
C609 0.001
9.0V
10.0V
30.0V
Q604 2SC632A
R633 20K (A)
R611 390
C610 4.7µ/25V
R614 9.1K
C613 100µ 6.3V
R619 3.9K
R637 10K
D5 1T243M
R612 22K
R616 3.3K
R635 10K
Q606 2SC632A
C623 220µ 16V
C616 0.22
C617 0.001
Q605 2SC631A
10.4V
R630 5.6K
C622 1µ 50V
R636 10K
10.0V
30.0V
R623 910K
R634 20K(A)
50.0V
9.0V
10.4V
C619 100P
R625 390K
R624 9.1K
C620 0.068
R628 22K
R621 390
C618 4.7µ/25V
R627 300
R629 3.9K
R610 5.6K
R622 22K
R626 2K
C621 100µ/6.3V
50.0V
Q602 2SC632A
10.4V
C606 1µ 50V
Q601 2SC631A
R605 390K
30.0V
C604 100P
C601 0.22
C602 0.001
R603 910K
R608 22K
10.4V
C605 0.15
10.0V
9.0V
R632 20K(A)
R604 9.1K
R609 3.9K
R601 390
C603 4.7µ/25V
C607 100µ/6.3V
R602 22K
R606 4.7K
R607 560

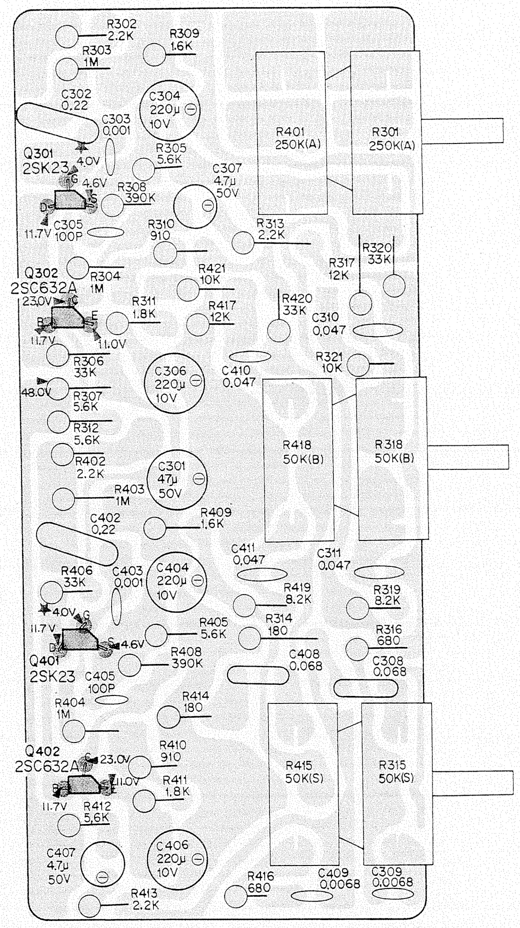
4-4. MOUNTING DIAGRAM – REAR TONE Amplifier

– Conductor Side –


Equalizer amplifier/(buffer amplifier/ power amplifier)/(low pass filter/buffer amplifier)/power supply board, C704 220µ 50V ⊕(P107)
Tone amplifier (FRONT)/headphone amplifier board, R226 5.6k (P221)
MIC amplifier board R612 22k (P403)
Ground, to tone amplifier (FRONT)/ headphone amplifier board (P222)
Tone amplifier (FRONT)/headphone amplifier board, R237 250k-(R-CH)-(VOLUME CONTROL)-(P205)
Ground, to tone amplifier (FRONT)/headphone amplifier board, R237 250k-(R-CH)-(VOLUME CONTROL)-(P206)
HEADPHONE SW, S6-2③-(R-CH)
RIGHT CHANNEL REAR OUT, J403
Ground, to RIGHT CHANNEL REAR OUT, J403
Tone amplifier (FRONT)/headphone amplifier board, R137 250k -(L-CH)-(VOLUME CONTROL)-(P208)
Ground, to tone amplifier (FRONT)/ headphone amplifier board, R137 250K-(L-CH)(VOLUME CONTROL)-(P209)
QUAD FUNCTION SW, S5-2R①
QUAD FUNCTION SW, S5-1R⑩
QUAD FUNCTION SW, S5-1R⑦
QUAD FUNCTION SW, S5-2R⑥
Ground, to LEFT CHANNEL REAR OUT, J303
LEFT CHANNEL REAR OUT, J303
HEADPHONE SW S6-1③-(R-CH)
BRN
BLK
WHT/RED
GRN
ORG
WHT/BLU
BLU
WHT/GRY
R
E
D
W
H
T
Q402 2SC632A
Q401 2SK23
Q302 2SC632A
Q301 2SK23
P301
P302
P303
P304
P305
P306
P307
P308
P309
P310
P311
P312
P313
P314
R413 2.2k
C406 220µ 10V
C407 4.7µ 50V
R412 5.6k
R411 1.8k
R410 910
R404 1M
R414 180
C405 100p
R408 390k
R405 5.6k
C403 0.001
C404 220µ 10V
R406 33k
C402 0.22
R409 1.6k
R403 1M
C401 4.7µ 50V
R402 2.2k
R312 5.6k
R307 5.6k
C306 220µ 10V
R306 33k
R311 1.8k
R304 1M
R310 910
C305 100p
C307 4.7µ 50V
R308 390k
R305 5.6k
C303 0.001
C302 0.22
C304 220µ 10V
R303 1M
R302 2.2k
R309 1.6k
R416 680
C409 0.0068
C309 0.0068
R415 50k(S)
R315 50k(S)
C408 0.068
C308 0.068
R314 180
R316 680
R419 8.2k
R319 8.2k
C411 0.047
C311 0.047
R418 50k(B)
R318 50k(B)
C410 0.047
C310 0.047
R321 10k
R417 12k
R421 10k
R420 33k
R313 2.2k
R317 12k
R320 33k
R401 250k(A)
R301 250k(A)
23.0V
11.7V
11.0V
4.6V
4.0V
8.0V

Note: ★ Measured with dc VTVM

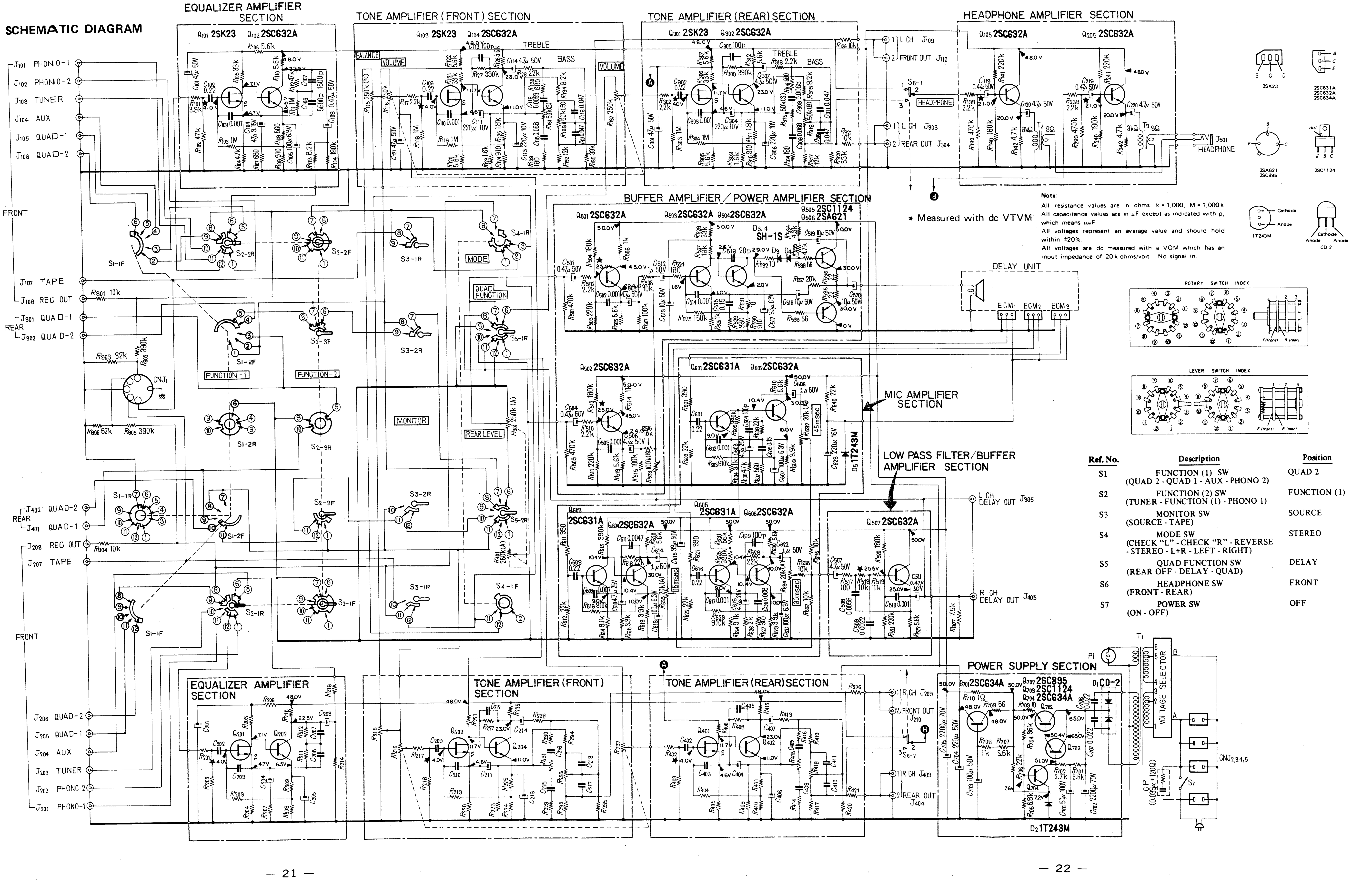
— *Component Side* —


R302
2.2K
R309
1.6K
R303
1M
C302
0.22
C304
220µ
10V
C303
0.001
R401
250K(A)
R301
250K(A)
Q301
2SK23
4.0V
R305
5.6K
C307
4.7µ
50V
G
4.6V
R308
390K
S
D
11.7V
C305
100P
R310
910
R313
2.2K
R320
33K
R317
12K
Q302
2SC632A
R304
1M
R421
10K
23.0V
C
R420
33K
E
R311
1.8K
R417
12K
C310
0.047
B
11.7V
11.0V
R306
33K
R321
10K
C306
220µ
10V
C410
0.047
48.0V
R307
5.6K
R312
5.6K
R418
50K(B)
R318
50K(B)
R402
2.2K
C301
47µ
50V
R403
1M
C402
0.22
R409
1.6K
C411
0.047
C311
0.047
R406
33K
C403
0.001
C404
220µ
10V
R419
8.2K
R319
8.2K
4.0V
G
11.7V
R405
5.6K
R314
180
R316
680
D
S
4.6V
R408
390K
C408
0.068
C308
0.068
Q401
2SK23
C405
100P
R404
1M
R414
180
R410
910
Q402
2SC632A
C
23.0V
R415
50K(S)
R315
50K(S)
B
E
11.0V
R411
1.8K
11.7V
R412
5.6K
C407
4.7µ
50V
C406
220µ
10V
R416
680
C409
0.0068
C309
0.0068
R413
2.2K

Note: ⭑ Measured with dc VTVM

MEMO

4-5. SCHEMATIC DIAGRAM


EQUALIZER AMPLIFIER SECTION
Q101 2SK23 Q102 2SC632A
TONE AMPLIFIER (FRONT) SECTION
Q103 2SK23 Q104 2SC632A
TREBLE
BASS
BALANCE
VOLUME
TONE AMPLIFIER (REAR) SECTION
Q301 2SK23 Q302 2SC632A
HEADPHONE AMPLIFIER SECTION
Q105 2SC632A Q205 2SC632A
HEADPHONE
J501 HEADPHONE
L CH J109
FRONT OUT J110
L CH J303
REAR OUT J304
J101 PHONO-1
J102 PHONO-2
J103 TUNER
J104 AUX
J105 QUAD-1
J106 QUAD-2
FRONT
J107 TAPE
J108 REC OUT
J301 QUAD-1
REAR
J302 QUAD-2
S1-1F
S2-2R
S2-2F
S3-1R
S4-1R
MODE
QUAD FUNCTION
S5-1R
S1-2F
S2-3F
S3-2R
FUNCTION-1
FUNCTION-2
MONITOR
REAR LEVEL
CNJ1
S1-2R
S2-9R
S1-1R
S2-3F
S3-2R
S5-2R
J402 QUAD-2
REAR
J401 QUAD-1
J208 REC OUT
J207 TAPE
S1-2F
S1-IF
S2-1R
S2-1F
S3-1R
S4-1F
FRONT
BUFFER AMPLIFIER / POWER AMPLIFIER SECTION
Q501 2SC632A
Q503 2SC632A Q504 2SC632A
Q505 2SC1124
Q506 2SA621
D3,4 SH-1S
DELAY UNIT
ECM1 ECM2 ECM3
Q502 2SC632A
Q601 2SC631A Q602 2SC632A
45msec
D5 1T243M
MIC AMPLIFIER SECTION
LOW PASS FILTER/BUFFER AMPLIFIER SECTION
L CH DELAY OUT J305
Q603 2SC631A Q604 2SC632A
Q605 2SC631A Q606 2SC632A
15msec
30msec
Q507 2SC632A
R CH DELAY OUT J405
EQUALIZER AMPLIFIER SECTION
TONE AMPLIFIER (FRONT) SECTION
TONE AMPLIFIER (REAR) SECTION
J206 QUAD-2
J205 QUAD-1
J204 AUX
J203 TUNER
J202 PHONO-2
J201 PHONO-1
R CH J209
FRONT OUT J210
R CH J403
REAR OUT J404
POWER SUPPLY SECTION
Q701 2SC634A
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D1 CD-2
D2 1T243M
PL
T1
VOLTAGE SELECTOR
CNJ2,3,4,5
S7
C.P. (0.033μ + 120Ω)
2SK23
2SC631A 2SC632A 2SC634A
2SA621 2SC895
2SC1124
1T243M
Cathode
Anode
CD-2
ROTARY SWITCH INDEX
F (front) R (rear)
LEVER SWITCH INDEX

★ Measured with dc VTVM

Note:

All resistance values are in ohms. k = 1,000, M = 1,000k

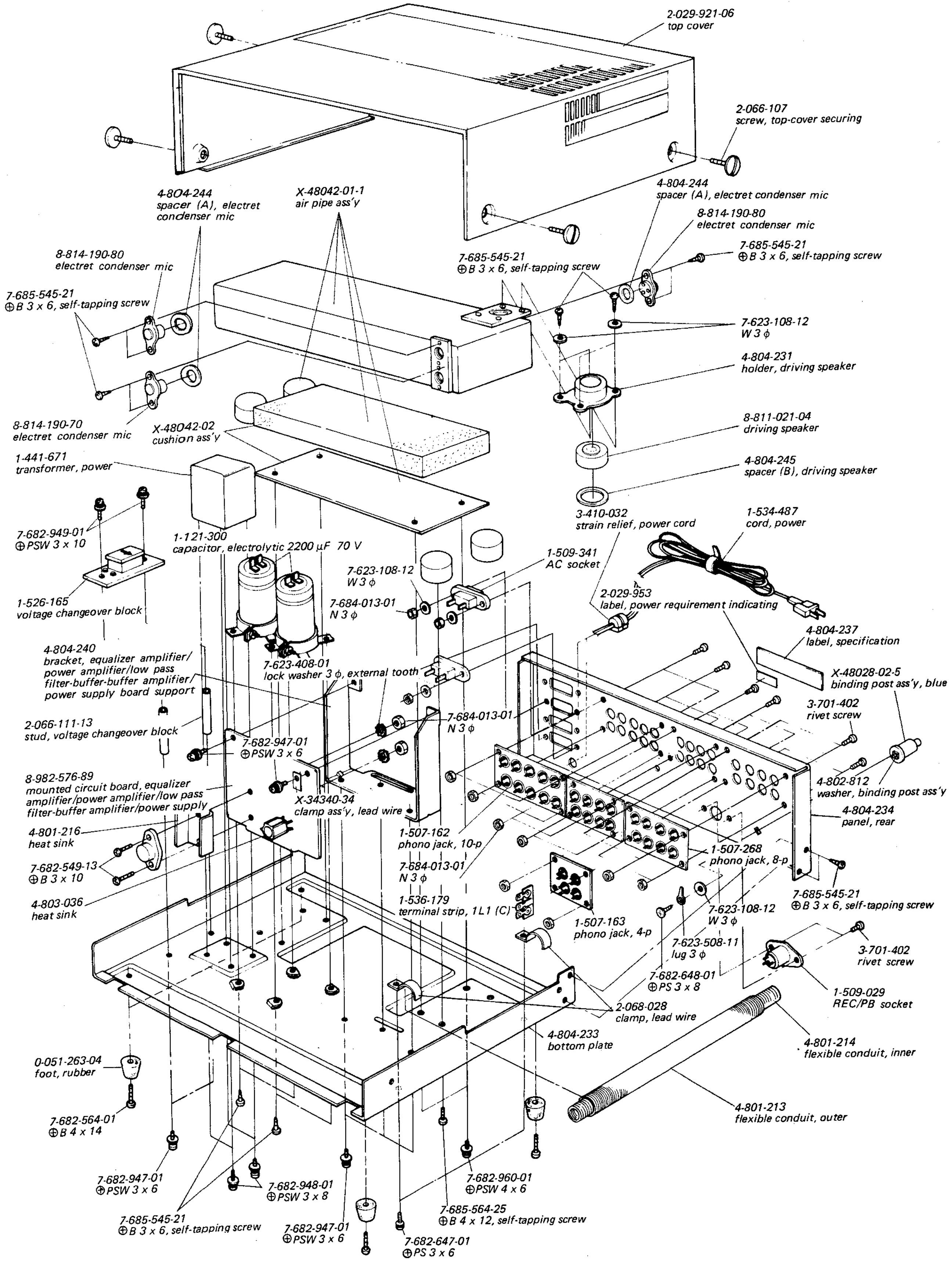
All capacitance values are in μF except as indicated with p, which means μμF.

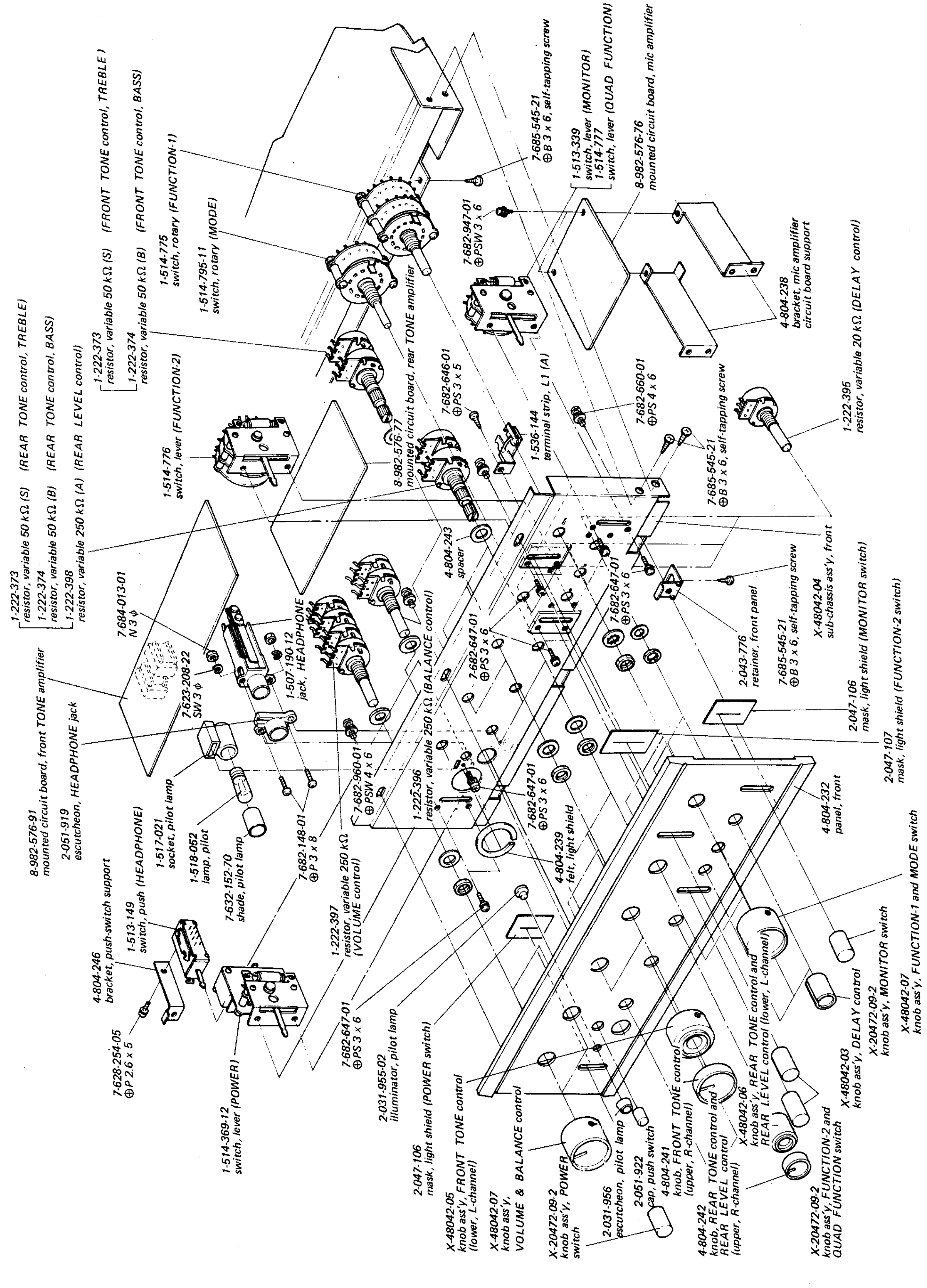
All voltages represent an average value and should hold within ±20%.

All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.

Ref. No.	Description	Position
S1	FUNCTION (1) SW (QUAD 2 - QUAD 1 - AUX - PHONO 2)	QUAD 2
S2	FUNCTION (2) SW (TUNER - FUNCTION (1) - PHONO 1)	FUNCTION (1)
S3	MONITOR SW (SOURCE - TAPE)	SOURCE
S4	MODE SW (CHECK "L" - CHECK "R" - REVERSE - STEREO - L+R - LEFT - RIGHT)	STEREO
S5	QUAD FUNCTION SW (REAR OFF - DELAY - QUAD)	DELAY
S6	HEADPHONE SW (FRONT - REAR)	FRONT
S7	POWER SW (ON - OFF)	OFF

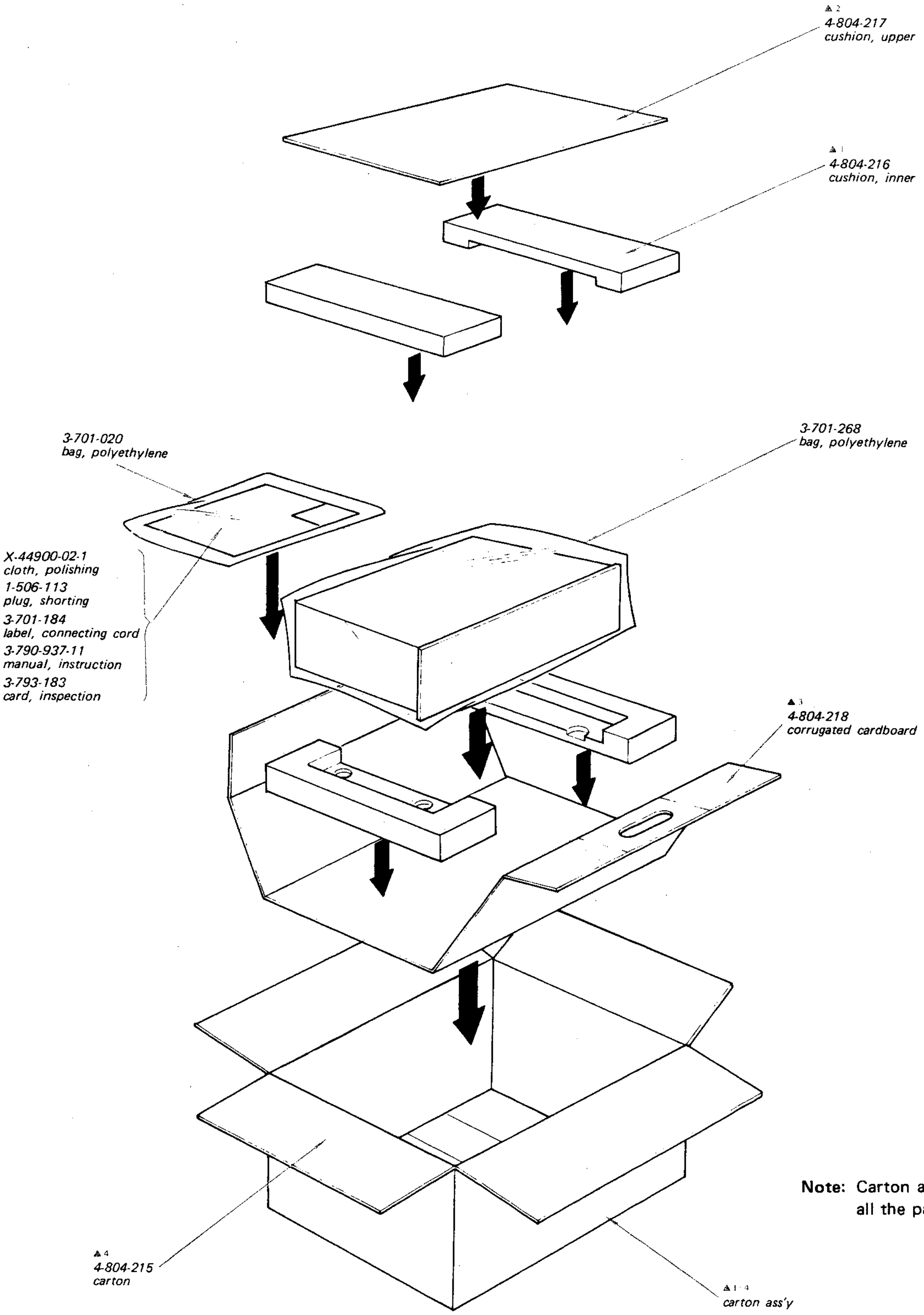
SECTIONS 5
EXPLODED VIEW


2-029-921-06
top cover
2-066-107
screw, top-cover securing
4-804-244
spacer (A), electret condenser mic
X-48042-01-1
air pipe ass'y
4-804-244
spacer (A), electret condenser mic
8-814-190-80
electret condenser mic
8-814-190-80
electret condenser mic
7-685-545-21
⊕B 3 x 6, self-tapping screw
7-685-545-21
⊕B 3 x 6, self-tapping screw
7-685-545-21
⊕B 3 x 6, self-tapping screw
7-623-108-12
W 3 φ
4-804-231
holder, driving speaker
8-814-190-70
electret condenser mic
X-48042-02
cushion ass'y
8-811-021-04
driving speaker
1-441-671
transformer, power
4-804-245
spacer (B), driving speaker
3-410-032
strain relief, power cord
1-534-487
cord, power
7-682-949-01
⊕PSW 3 x 10
1-121-300
capacitor, electrolytic 2200 μF 70 V
7-623-108-12
W 3 φ
1-509-341
AC socket
7-684-013-01
N 3 φ
2-029-953
label, power requirement indicating
1-526-165
voltage changeover block
4-804-237
label, specification
4-804-240
bracket, equalizer amplifier/power amplifier/low pass filter-buffer-buffer amplifier/power supply board support
7-623-408-01
lock washer 3 φ, external tooth
X-48028-02-5
binding post ass'y, blue
3-701-402
rivet screw
7-684-013-01
N 3 φ
2-066-111-13
stud, voltage changeover block
7-682-947-01
⊕PSW 3 x 6
8-982-576-89
mounted circuit board, equalizer amplifier/power amplifier/low pass filter-buffer amplifier/power supply
X-34340-34
clamp ass'y, lead wire
4-802-812
washer, binding post ass'y
4-804-234
panel, rear
4-801-216
heat sink
1-507-162
phono jack, 10-p
1-507-268
phono jack, 8-p
7-682-549-13
⊕B 3 x 10
7-684-013-01
N 3 φ
7-685-545-21
⊕B 3 x 6, self-tapping screw
4-803-036
heat sink
1-536-179
terminal strip, 1L1 (C)
7-623-108-12
W 3 φ
1-507-163
phono jack, 4-p
7-623-508-11
lug 3 φ
3-701-402
rivet screw
7-682-648-01
⊕PS 3 x 8
1-509-029
REC/PB socket
2-068-028
clamp, lead wire
4-804-233
bottom plate
4-801-214
flexible conduit, inner
0-051-263-04
foot, rubber
4-801-213
flexible conduit, outer
7-682-564-01
⊕B 4 x 14
7-682-947-01
⊕PSW 3 x 6
7-682-948-01
⊕PSW 3 x 8
7-682-960-01
⊕PSW 4 x 6
7-685-564-25
⊕B 4 x 12, self-tapping screw
7-685-545-21
⊕B 3 x 6, self-tapping screw
7-682-947-01
⊕PSW 3 x 6
7-682-647-01
⊕PS 3 x 6


1-222-373
resistor, variable 50 kΩ (S) (REAR TONE control, TREBLE)
1-222-374
resistor, variable 50 kΩ (B) (REAR TONE control, BASS)
1-222-398
resistor, variable 250 kΩ (A) (REAR LEVEL control)
1-222-373
resistor, variable 50 kΩ (S) (FRONT TONE control, TREBLE)
1-222-374
resistor, variable 50 kΩ (B) (FRONT TONE control, BASS)
1-514-775
switch, rotary (FUNCTION-1)
1-514-795-11
switch, rotary (MODE)
1-514-776
switch, lever (FUNCTION-2)
7-684-013-01
N 3 φ
7-623-208-22
SW 3 φ
1-507-190-12
jack, HEADPHONE
8-982-576-77
mounted circuit board, rear TONE amplifier
7-682-646-01
⊕PS 3 x 5
7-682-947-01
⊕PSW 3 x 6
1-513-339
switch, lever (MONITOR)
1-514-777
switch, lever (QUAD FUNCTION)
7-685-545-21
⊕B 3 x 6, self-tapping screw
8-982-576-76
mounted circuit board, mic amplifier
4-804-238
bracket, mic amplifier circuit board support
1-222-395
resistor, variable 20 kΩ (DELAY control)
1-536-144
terminal strip, L1 (A)
7-682-660-01
⊕PS 4 x 6
7-685-545-21
⊕B 3 x 6, self-tapping screw
4-804-243
spacer
1-222-396
resistor, variable 250 kΩ (BALANCE control)
7-682-647-01
⊕PS 3 x 6
7-682-647-01
⊕PS 3 x 6
7-682-647-01
⊕PS 3 x 6
7-682-960-01
⊕PSW 4 x 6
X-48042-04
sub-chassis ass'y, front
7-685-545-21
⊕B 3 x 6, self-tapping screw
2-043-776
retainer, front panel
2-047-106
mask, light shield (MONITOR switch)
2-047-107
mask, light shield (FUNCTION-2 switch)
4-804-232
panel, front
8-982-576-91
mounted circuit board, front TONE amplifier
2-051-919
escutcheon, HEADPHONE jack
1-513-149
switch, push (HEADPHONE)
1-517-021
socket, pilot lamp
1-518-052
lamp, pilot
7-632-152-70
shade, pilot lamp
7-682-148-01
⊕P 3 x 8
1-222-397
resistor, variable 250 kΩ (VOLUME control)
4-804-239
felt, light shield
4-804-246
bracket, push-switch support
7-628-254-05
⊕P 2.6 x 5
1-514-369-12
switch, lever (POWER)
7-682-647-01
⊕PS 3 x 6
2-031-955-02
illuminator, pilot lamp
2-047-106
mask, light shield (POWER switch)
X-48042-05
knob ass'y, FRONT TONE control (lower, L-channel)
X-48042-07
knob ass'y, VOLUME & BALANCE control
X-20472-09-2
knob ass'y, POWER switch
2-031-956
escutcheon, pilot lamp
2-051-922
cap, push switch
4-804-241
knob, FRONT TONE control (upper, R-channel)
4-804-242
knob, REAR TONE control and REAR LEVEL control (upper, R-channel)
X-48042-06
knob ass'y, REAR TONE control and REAR LEVEL control (lower, L-channel)
X-48042-03
knob ass'y, DELAY control
X-20472-09-2
knob ass'y, MONITOR switch
X-48042-07
knob ass'y, FUNCTION-1 and MODE switch
X-20472-09-2
knob ass'y, FUNCTION-2 and QUAD FUNCTION switch

SECTION 6
REPACKING

The TA2244's original shipping carton and packing materials are the ideal containers for shipping the unit. However to secure the maximum protection, the TA2244 must be repacked in these materials precisely as before. The proper repacking procedures are shown in Fig. 6-1.


▲2
4-804-217
cushion, upper
▲1
4-804-216
cushion, inner
3-701-020
bag, polyethylene
3-701-268
bag, polyethylene
X-44900-02-1
cloth, polishing
1-506-113
plug, shorting
3-701-184
label, connecting cord
3-790-937-11
manual, instruction
3-793-183
card, inspection
▲3
4-804-218
corrugated cardboard
▲4
4-804-215
carton
▲1-4
carton ass'y

Note: Carton ass'y includes all the parts marked ▲

Fig. 6-1. Repacking

SECTION 7
ELECTRICAL PARTS LIST

MOUNTED CIRCUIT BOARDS

Ref. No.	Part No.	Description
	8-982-576-76	MIC amplifier circuit board
	8-982-576-77	REAR TONE amplifier circuit board
	8-982-576-89	equalizer amplifier/power amplifier/ low pass filter – buffer amplifier/ power supply circuit board
	8-982-576-91	FRONT TONE amplifier/headphone amplifier circuit board

SEMICONDUCTORS

Ref. No.	Part No.	Description	
D1		diode,	CD-2
D2		diode,	1T243M
D3		diode,	SH1S
D4		diode,	SH1S
D5		diode,	1T243M
Q101 (Q201)		FET,	2SK23
Q102 (Q202)		transistor,	2SC632A
Q103 (Q203)		FET,	2SK23
Q104 (Q204)		transistor,	2SC632A
Q105 (Q205)		transistor,	2SC632A
Q301 (Q401)		FET,	2SK23
Q302 (Q402)		transistor,	2SC632A
Q501		transistor,	2SC632A
Q502		transistor,	2SC632A
Q503		transistor,	2SC632A
Q504		transistor,	2SC632A
Q505		transistor,	2SC1124
Q506		transistor,	2SA621
Q507		transistor,	2SC632A
Q601		transistor,	2SC631A
Q602		transistor,	2SC632A
Q603		transistor,	2SC631A
Q604		transistor,	2SC632A
Q605		transistor,	2SC631A
Q606		transistor,	2SC631A
Q701		transistor,	2SC634A
Q702		transistor,	2SC895
Q703		transistor,	2SC1124
Q704		transistor,	2SC634A

TRANSFORMERS

Ref. No.	Part No.	Description
T1	1-441-671	transformer, power
T2	1-427-217	transformer, output
T3	1-427-217	transformer, output

CAPACITORS

All capacitance values are in μF except as indicated with p, which means μμF.

Ref. No.	Part No.	Description			
C101 (C201)	1-121-411	47	$\pm^{100}_{10}$%	50V	electrolytic
C102 (C202)	1-105-849-12	0.22	±20%	50V	mylar
C103 (C203)	1-105-821-12	0.001	±20%	50V	mylar
C104 (C204)	1-121-409	47	$\pm^{100}_{10}$%	16V	electrolytic
C105 (C205)	1-121-413	100	$\pm^{100}_{10}$%	6.3V	electrolytic
C106 (C206)	1-105-510-12	0.0056	±5%	50V	mylar
C107 (C207)	1-105-503-12	0.0015	±10%	50V	mylar
C108 (C208)	1-121-726	0.47	$\pm^{150}_{10}$%	50V	electrolytic
C109 (C209)	1-105-849-12	0.22	±20%	50V	mylar
C110 (C210)	1-105-821-12	0.001	±20%	50V	mylar
C111 (C211)	1-121-420	220	$\pm^{100}_{10}$%	10V	electrolytic
C112 (C212)	1-107-131	100p	±10%	50V	mica
C113 (C213)	1-121-420	220	$\pm^{100}_{10}$%	10V	electrolytic
C114 (C214)	1-121-396	4.7	$\pm^{100}_{10}$%	50V	electrolytic
C115 (C215)	1-105-683-12	0.068	±10%	50V	mylar
C116 (C216)	1-105-671-12	0.0068	±10%	50V	mylar
C117 (C217)	1-105-681-12	0.047	±10%	50V	mylar
C118 (C218)	1-105-681-12	0.047	±10%	50V	mylar
C119 (C219)	1-121-726	0.47	$\pm^{150}_{10}$%	50V	electrolytic
C120 (C220)	1-121-396	4.7	$\pm^{100}_{10}$%	50V	electrolytic
C121	1-121-411	47	$\pm^{100}_{10}$%	50V	electrolytic
C301	1-121-411	47	$\pm^{100}_{10}$%	50V	electrolytic
C302 (C402)	1-105-849-12	0.22	±20%	50V	mylar
C303 (C403)	1-105-821-12	0.001	±20%	50V	mylar
C304 (C404)	1-121-420	220	$\pm^{100}_{10}$%	10V	electrolytic
C305 (C405)	1-107-131	100p	±10%	50V	mica

Ref. No.	*Part No.*	*Description*			
C306 (C406)	1-121-420	220	$\pm^{100}_{10}\%$	10V	electrolytic
C307 (C407)	1-121-396	4.7	$\pm^{100}_{10}\%$	50V	electrolytic
C308 (C408)	1-105-683-12	0.068	±10%	50V	mylar
C309 (C409)	1-105-671-12	0.0068	±10%	50V	mylar
C310 (C410)	1-105-681-12	0.047	±10%	50V	mylar
C311 (C411)	1-105-681-12	0.047	±10%	50V	mylar
C501	1-121-726	0.47	$\pm^{150}_{10}\%$	50V	electrolytic
C502	1-105-821-12	0.001	±20%	50V	mylar
C503	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C504	1-121-726	0.47	$\pm^{150}_{10}\%$	50V	electrolytic
C505	1-105-821-12	0.001	±20%	50V	mylar
C506	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C507	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C508	1-105-510-12	0.0056	±5%	50V	mylar
C509	1-105-505-12	0.0022	±10%	50V	mylar
C510	1-105-821-12	0.001	±20%	50V	mylar
C511	1-121-726	0.47	$\pm^{150}_{10}\%$	50V	electrolytic
C512	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C513	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C514	1-105-821-12	0.001	±20%	50V	mylar
C515	1-105-687-12	0.15	±10%	50V	mylar
C516	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C517	1-121-402	33	$\pm^{100}_{10}\%$	10V	electrolytic
C518	1-107-114	20p	±5%	50V	mica
C519	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C520	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C601	1-105-849-12	0.22	±20%	50V	mylar
C602	1-105-821-12	0.001	±20%	50V	mylar
C603	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C604	1-107-131	100p	±10%	50V	mica
C605	1-105-687-12	0.15	±10%	50V	mylar
C606	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C607	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C608	1-105-849-12	0.22	±20%	50V	mylar
C609	1-105-821-12	0.001	±20%	50V	mylar
C610	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C611	1-105-669-12	0.0047	±10%	50V	mylar
C613	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C614	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C615	1-121-405	33	$\pm^{100}_{10}\%$	50V	electrolytic
C616	1-105-849-12	0.22	±20%	50V	mylar
C617	1-105-821-12	0.001	±20%	50V	mylar
C618	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C619	1-107-131	100p	±10%	50V	mica
C620	1-105-683-12	0.068	±10%	50V	mylar
C621	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C622	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C623	1-121-421	220	$\pm^{100}_{10}\%$	16V	electrolytic
C701	1-121-559	50	$\pm^{100}_{10}\%$	100V	electrolytic
C702	1-121-300	2,200	$\pm^{100}_{10}\%$	70V	electrolytic
C703	1-121-417	100	$\pm^{100}_{10}\%$	50V	electrolytic
C704	1-121-423	220	$\pm^{100}_{10}\%$	50V	electrolytic
C705	1-121-300	2,200	$\pm^{100}_{10}\%$	70V	electrolytic
C706	1-105-917-12	0.022	±20%	200V	mylar
C707	1-105-917-12	0.022	±20%	200V	mylar

RESISTORS

All resistance values are in ohms, ±5%, ¼ watts and carbon type unless otherwise indicated.

R101 (R201)	1-244-687-31	3.9k	±10%
R102 (R202)	1-244-713	47k	
R103 (R203)	1-244-745	1M	
R104 (R204)	1-244-689	4.7k	
R105 (R205)	1-244-709	33k	
R106 (R206)	1-244-691	5.6k	
R107 (R207)	1-244-669	680	
R108 (R208)	1-244-672	910	
R109 (R209)	1-244-667	560	
R110 (R210)	1-244-691	5.6k	
R111 (R211)	1-244-745	1M	
R112 (R212)	1-244-713	47k	
R113 (R213)	1-244-695	8.2k	
R114 (R214)	1-244-727-31	180k	±10%
R115 (R215)	1-222-396	250k (N/M),	variable (BALANCE control)
R116 (R216)	1-222-397	250k,	variable (VOLUME control)
R117 (R217)	1-242-681-31	2.2k	±10%
R118 (R218)	1-242-745-31	1M	±10%
R119 (R219)	1-242-745	1M	
R120 (R220)	1-242-691	5.6k	
R121 (R221)	1-242-709	33k	
R122	1-242-691	5.6k	
R123 (R223)	1-242-678	1.6k	

Ref. No.	Part No.	Description
R124 (R224)	1-242-672	910
R125 (R225)	1-242-679	1.8k
R126 (R226)	1-242-691-31	5.6k ±10%
R127 (R227)	1-242-735	390k
R128 (R228)	1-242-681-31	2.2k ±10%
R129 (R229)	1-242-655	180
R130 (R230)	1-242-669	680
R131 (R231)	1-222-373	50k (S), variable (FRONT TONE control, TREBLE)
R132 (R232)	1-242-699	12k
R133 (R233)	1-222-374	50k (B), variable (FRONT TONE control, BASS)
R134 (R234)	1-242-695	8.2k
R135 (R235)	1-242-709	33k
R136 (R236)	1-242-697	10k
R137 (R237)	1-222-397	250k, variable (VOLUME control)
R138 (R238)	1-242-681-31	2.2k ±10%
R139 (R239)	1-242-737-31	470k ±10%
R140 (R240)	1-242-727-31	180k ±10%
R141 (R241)	1-242-729-31	220k ±10%
R142 (R242)	1-242-689-31	4.7k ±10%
R301 (R401)	1-222-398	250k (A/A), variable (REAR LEVEL control)
R302 (R402)	1-242-681-31	2.2k ±10%
R303 (R403)	1-242-745-31	1M ±10%
R304 (R404)	1-242-745	1M
R305 (R405)	1-242-691	5.6k
R306 (R406)	1-242-709	33k
R307	1-242-691-31	5.6k ±10%
R308 (R408)	1-242-735	390k
R309 (R409)	1-242-677	1.6k
R310 (R410)	1-242-672	910
R311 (R411)	1-242-679	1.8k
R312 (R412)	1-242-691-31	5.6k ±10%
R313 (R413)	1-242-681-31	2.2k ±10%
R314 (R414)	1-242-655	180
R315 (R415)	1-222-373	50k (S), variable (REAR TONE control, TREBLE)
R316 (R416)	1-242-669	680
R317 (R417)	1-242-699	12k
R318 (R418)	1-222-374	50k (B), variable (REAR TONE control, BASS)

Ref. No.	Part No.	Description
R319 (R419)	1-242-695	8.2k
R320 (R420)	1-242-709	33k
R321 (R421)	1-242-697	10k
R501	1-244-737-31	470k ±10%
R502	1-244-681-31	2.2k ±10%
R503	1-244-729	220k
R504	1-244-727	180k
R505	1-244-691-31	5.6k ±10%
R506	1-244-673-31	1k ±10%
R507	1-244-721-31	100k ±10%
R508	1-244-697-31	10k ±10%
R509	1-244-737-31	470k ±10%
R510	1-244-681-31	2.2k ±10%
R511	1-244-729	220k
R512	1-244-727	180k
R513	1-244-691-31	5.6k ±10%
R514	1-244-673-31	1k ±10%
R515	1-244-721-31	100k ±10%
R516	1-244-697-31	10k ±10%
R517	1-244-649-31	100 ±10%
R518	1-244-697-31	10k ±10%
R519	1-244-673	1k
R520	1-244-727-31	180k ±10%
R521	1-244-729-31	220k ±10%
R522	1-244-691-31	5.6k ±10%
R523	1-222-987	100k (B) ±3%, semi-fixed
R524	1-244-655-31	180 ±10%
R525	1-244-725	150k
R526	1-244-673	1k
R527	1-244-700	13k
R528	1-244-709-31	33k ±10%
R529	1-244-661	330
R530	1-244-672	910
R531	1-244-625	10
R532	1-244-625	10
R533	1-244-689-31	4.7k ±10%
R534	1-244-688-31	4.3k ±10%
R535	1-244-633	22
R536	1-244-633	22
R537	1-244-704	20k
R538	1-244-643-31	56
R539	1-244-643-31	56

Ref. No.	Part No.	Description	
R601	1-242-663-31	390	±10%
R602	1-242-705-31	22k	±10%
R603	1-242-744	910k	
R604	1-242-696	9.1k	
R605	1-242-735	390k	
R606	1-242-689	4.7k	
R607	1-242-667	560	
R608	1-242-705	22k	
R609	1-242-687	3.9k	
R610	1-242-691-31	5.6k	±10%
R611	1-242-663-31	390	±10%
R612	1-242-705-31	22k	±10%
R613	1-242-744	910k	
R614	1-242-696	9.1k	
R615	1-242-735	390k	
R616	1-242-685	3.3k	
R618	1-242-705	22k	
R619	1-242-687	3.9k	
R620	1-242-691-31	5.6k	±10%
R621	1-242-663-31	390	±10%
R622	1-242-705-31	22k	±10%
R623	1-242-744	910k	±10%
R624	1-242-696	9.1k	
R625	1-242-735	390k	
R626	1-242-680	2k	
R627	1-242-660	300	
R628	1-242-705	22k	
R629	1-242-687	3.9k	
R630	1-242-691-31	5.6k	±10%
R631	1-242-715-31	56k	±10%
R632	1-222-395	20k (A), variable (DELAY control)	
R633	1-222-395	20k (A), variable (DELAY control)	
R634	1-222-395	20k (A), variable (DELAY control)	
R635	1-242-697-31	10k	±10%
R636	1-242-697-31	10k	±10%
R637	1-242-697-31	10k	±10%
R640	1-242-705-31	22k	±10%
R701	1-244-691-31	5.6k	±10%
R702	1-244-683-31	2.7k	±10%
R703	1-244-625-31	10	±10%
R704	1-244-710	36k	
R705	1-244-693	6.8k	

Ref. No.	Part No.	Description	
R706	1-244-705-31	22k	±10%
R707	1-244-691-31	5.6k	±10%
R708	1-244-673-31	1k	±10%
R709	1-244-643-31	56	±10%
R710	1-244-601-31	1	±10%
R801	1-244-697-31	10k	±10%
R802	1-244-735-31	390k	±10%
R803	1-244-719-31	82k	±10%
R804	1-244-697-31	10k	±10%
R805	1-244-735-31	390k	±10%
R806	1-244-719-31	82k	±10%
R807	1-244-694	7.5k	

SWITCHES

S1	1-514-775	switch, rotary	(FUNCTION 1)
S2	1-514-776	switch, lever	(FUNCTION 2)
S3	1-513-339	switch, lever	(MONITOR)
S4	1-514-795	switch, rotary	(MODE)
S5	1-514-777	switch, lever	(QUAD FUNCTION)
S6	1-513-149	switch, push	(HEADPHONE)
S7	1-514-369-12	switch, lever	(POWER)

MISCELLANEOUS

	1-231-057-12	encapsulated component, 120Ω + 0.033μF
	1-507-162	phono jack, 10-p
	1-507-163	phono jack, 4-p
	1-507-190-12	jack, HEADPHONE
	1-507-268	phono jack, 8-p
	1-509-029	REC/PB socket
	1-509-341	AC socket
	1-517-021	socket, pilot lamp
	1-518-052	lamp, pilot
	1-526-165	voltage changeover block
	1-534-487	cord, power
	1-536-144	terminal strip, L1(A)
	1-536-179	terminal strip, 1L1(C)
	8-811-021-04	driving speaker
ECM 1, 2	8-814-190-80	electret condenser mic
ECM3	8-814-190-70	electret condenser mic

TA-2240

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SECTION 1
TECHNICAL SPECIFICATIONS

1-1. TECHNICAL SPECIFICATIONS

Technical specifications for the TA-2240 are given in Table 1-1.

TABLE 1-1. TECHNICAL SPECIFICATIONS

Harmonic distortion:	Less than 0.1% at rated output (REAR OUTPUT, 1 kHz, 1 volt TONE control flat)		
IM distortion: (60 Hz : 7 kHz = 4 : 1)	Less than 0.2% at rated output (REAR OUTPUT, 1 kHz, 1 volt TONE control flat)		
Input sensitivity and impedance:	INPUT: (FRONT PREAMP CONNECTOR)	150 mV	100k
	QUAD INPUT 1, 2: (FRONT, REAR)	150 mV	100k
	TAPE:	150 mV	100k
	REC/PB: (input)	150 mV	100k
Output voltage and impedance (with rated input):	OUTPUT: (FRONT PREAMP CONNECTOR)	1 V	10k
	REAR OUTPUT 1, 2:	1 V	10k
	DELAY OUTPUT:	1 V	2k
	REC OUT:	150 mV	10k
	REC/PB: (output)	30 mV	80k
	HEADPHONE out:	100 mV	8 ohm
Signal to noise ratio:	QUAD INPUT 1, 2: (FRONT, REAR)	greater than 90 dB (weighting net-work "A")	
	TAPE:	greater than 90 dB (weighting net-work "A")	
Frequency response:	INPUT (FRONT PREAMP CONNECTOR), QUAD INPUT 1, 2, TAPE:	10 Hz to 100 kHz $\pm^{0}_{2}$ dB	
Tone controls:	BASS:	±10 dB at 100 Hz	
	TREBLE:	±10 dB at 10 kHz	
Residual noise:	Less than 100 μV		
General			
Power consumption:	Approx. 13 watts		
Power requirement:	100, 117, 220 or 240 volts, 50/60 Hz ac		
Dimensions:	400 mm (width) x 149 mm (height) x 327 m (depth) 15¾" (width) x 5⅞" (height) x 12⅞" (depth)		
Net weight:	8 kg (17 lb 10 oz)		
Shipping weight:	11.2 kg (24 lb 11 oz)		

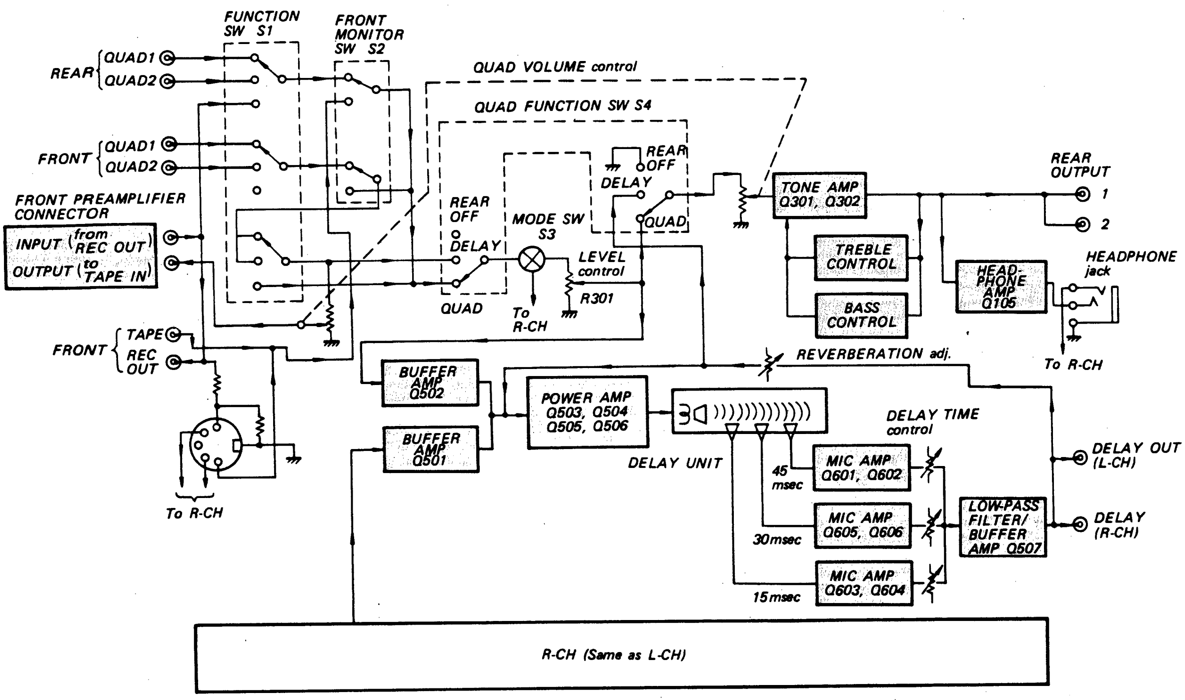
SECTION 2
SERVICING NOTES

SERVICING NOTES

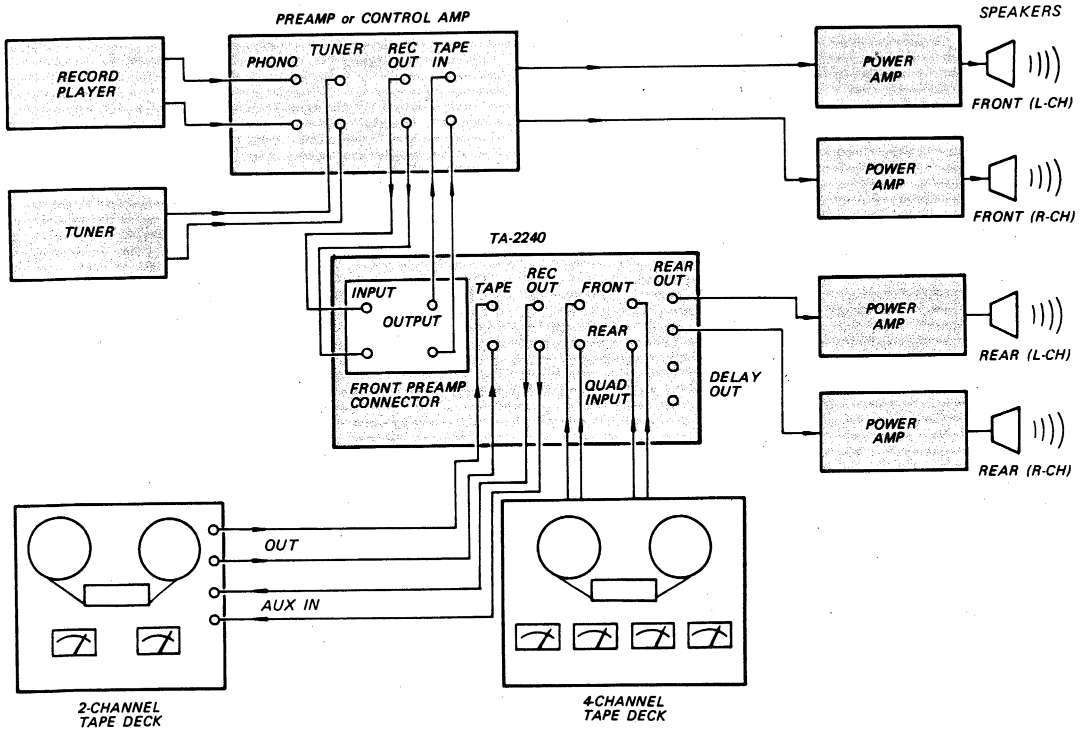
1. The tone control section and delay unit section are identical with those of TA-2244. Refer to the TA-2244's circuit analysis for your reference.
2. Refer to the TA-2244's disassembly procedures for removing or replacing the part.
3. To understand the TA-2240's operation, refer to the block diagram and setup diagram on page 33.
4. For operational check, refer to TA-2240's overall check and measurement procedures as given on page 13.

SECTION 3
BLOCK DIAGRAM AND SETUP DIAGRAM

BLOCK DIAGRAM


FUNCTION SW S1
FRONT MONITOR SW S2
REAR
QUAD1
QUAD2
FRONT
QUAD1
QUAD2
QUAD VOLUME control
QUAD FUNCTION SW S4
FRONT PREAMPLIFIER CONNECTOR
INPUT (from REC OUT)
OUTPUT (to TAPE IN)
REAR OFF
DELAY
QUAD
REAR OFF
DELAY
MODE SW S3
QUAD
LEVEL control
R301
To R-CH
TONE AMP Q301, Q302
TREBLE CONTROL
BASS CONTROL
HEAD-PHONE AMP Q105
REAR OUTPUT
1
2
HEADPHONE jack
To R-CH
FRONT
TAPE
REC OUT
To R-CH
REVERBERATION adj.
BUFFER AMP Q502
BUFFER AMP Q501
POWER AMP Q503, Q504 Q505, Q506
DELAY UNIT
DELAY TIME control
45 msec
MIC AMP Q601, Q602
30msec
MIC AMP Q605, Q606
15msec
MIC AMP Q603, Q604
LOW-PASS FILTER/ BUFFER AMP Q507
DELAY OUT (L-CH)
DELAY (R-CH)
R-CH (Same as L-CH)

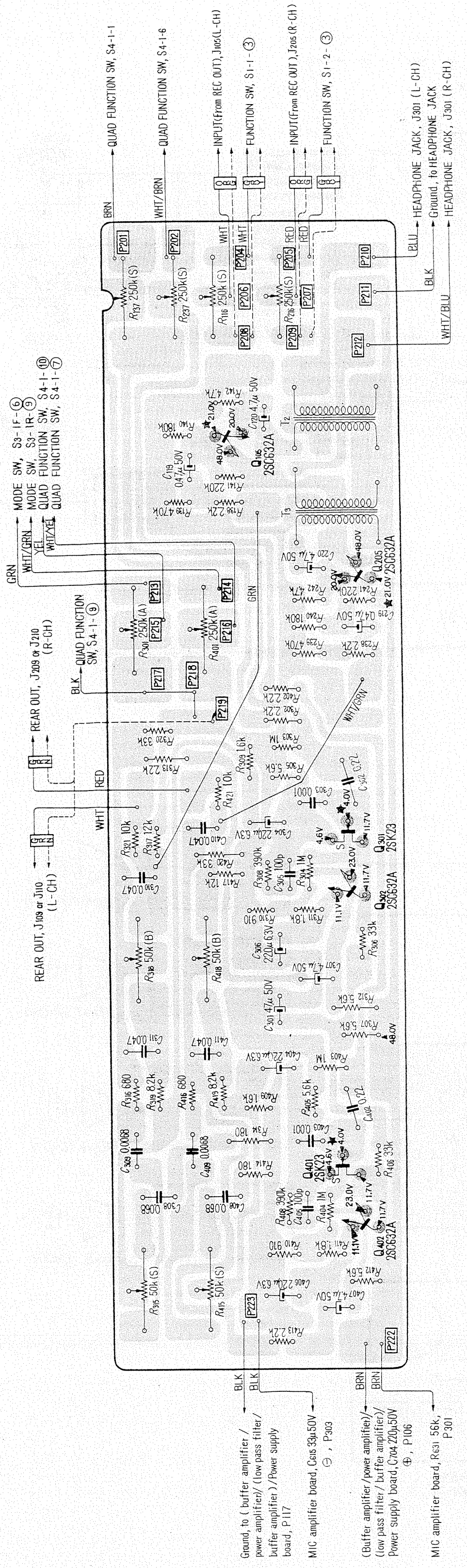
TA-2240 SETUP DIAGRAM


PREAMP or CONTROL AMP
PHONO
TUNER
REC OUT
TAPE IN
RECORD PLAYER
TUNER
SPEAKERS
POWER AMP
FRONT (L-CH)
POWER AMP
FRONT (R-CH)
TA-2240
INPUT
OUTPUT
FRONT PREAMP CONNECTOR
TAPE
REC OUT
FRONT
REAR
QUAD INPUT
REAR OUT
DELAY OUT
POWER AMP
REAR (L-CH)
POWER AMP
REAR (R-CH)
OUT
AUX IN
2-CHANNEL TAPE DECK
4-CHANNEL TAPE DECK

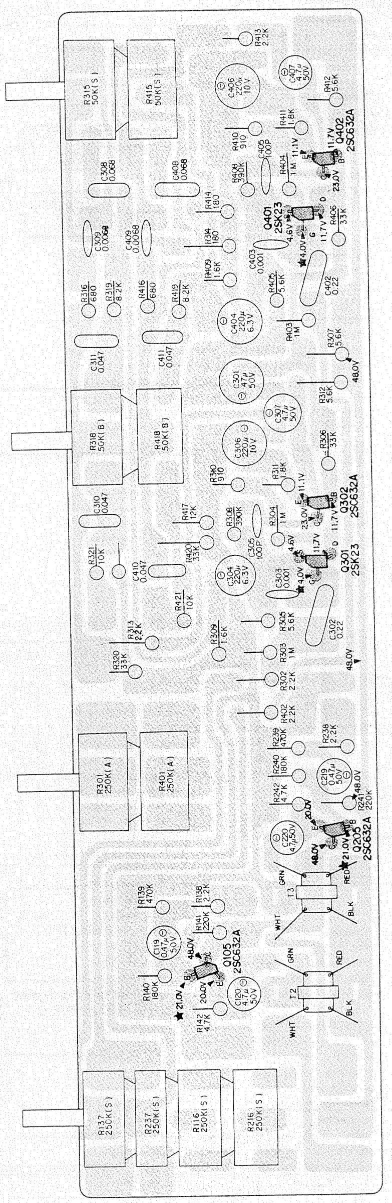
SECTION 4
MOUNTING DIAGRAM

4-1. REAR TONE Control Circuit Board

— Conductor Side —

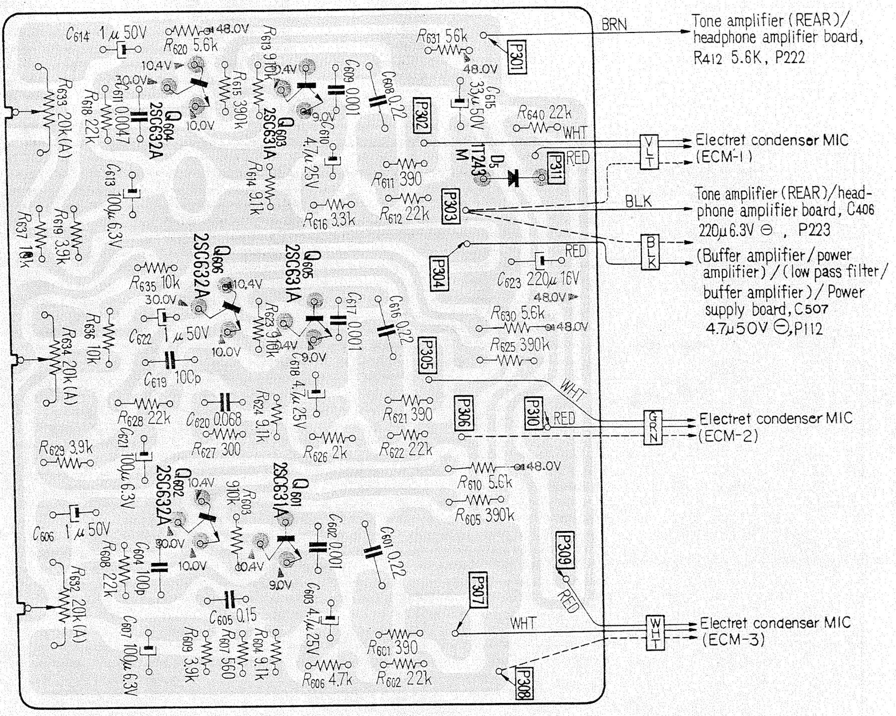

QUAD FUNCTION SW, S4-1-1
QUAD FUNCTION SW, S4-1-6
INPUT(From REC OUT),J305(L-CH)
FUNCTION SW, S1-1-③
INPUT(From REC OUT),J205(R-CH)
FUNCTION SW, S1-2-③
HEADPHONE JACK, J301 (L-CH)
Ground, to HEADPHONE JACK
HEADPHONE JACK, J301 (R-CH)
MODE SW, S3-1F-⑥
MODE SW, S3-1R-⑨
QUAD FUNCTION SW, S4-1-⑩
QUAD FUNCTION SW, S4-1-⑦
QUAD FUNCTION SW, S4-1-⑨
REAR OUT, J209 or J210 (R-CH)
REAR OUT, J109 or J110 (L-CH)
Ground, to (buffer amplifier / power amplifier) / (low pass filter / buffer amplifier) / Power supply board, P117
MIC amplifier board, C305 33μ50V ⊖, P303
(Buffer amplifier / power amplifier) / (low pass filter / buffer amplifier) / Power supply board, C104 220μ50V ⊕, P106
MIC amplifier board, R331 56k, P301
BRN
WHT/BRN
WHT
RED
BLU
BLK
WHT/BLU
GRN
WHT/GRN
YEL
WHT/YEL
WHT/GRY
Q105 2SC632A
Q205 2SC632A
Q301 2SK23
Q302 2SC632A
Q401 2SK23
Q402 2SC632A
T2
T3

— Component Side —

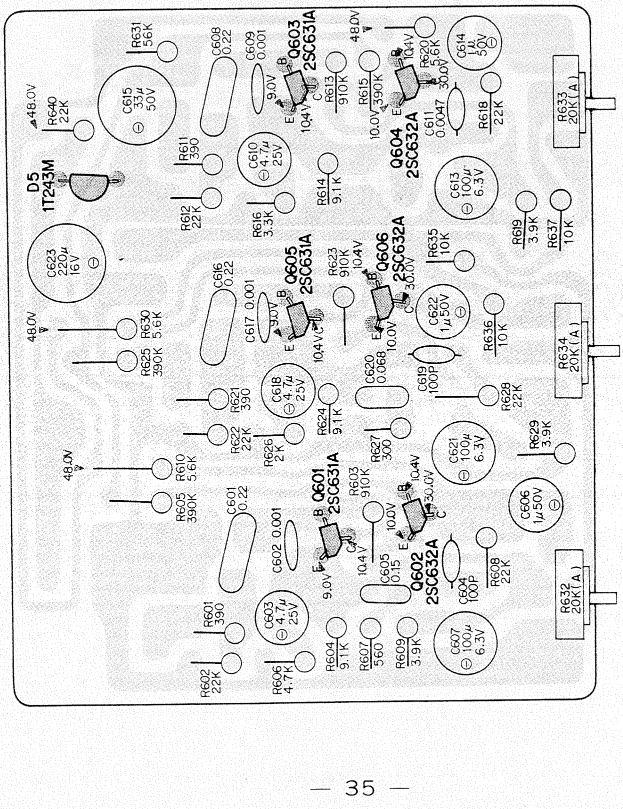

R315 50K(S)
R415 50K(S)
R318 50K(B)
R418 50K(B)
R301 250K(A)
R401 250K(A)
R137 250K(S)
R237 250K(S)
R116 250K(S)
R216 250K(S)
Q401 2SK23
Q402 2SC632A
Q301 2SK23
Q302 2SC632A
Q205 2SC632A
Q105 2SC632A
T2
T3

4-2. MIC Amplifier Circuit Board

— Conductor Side —

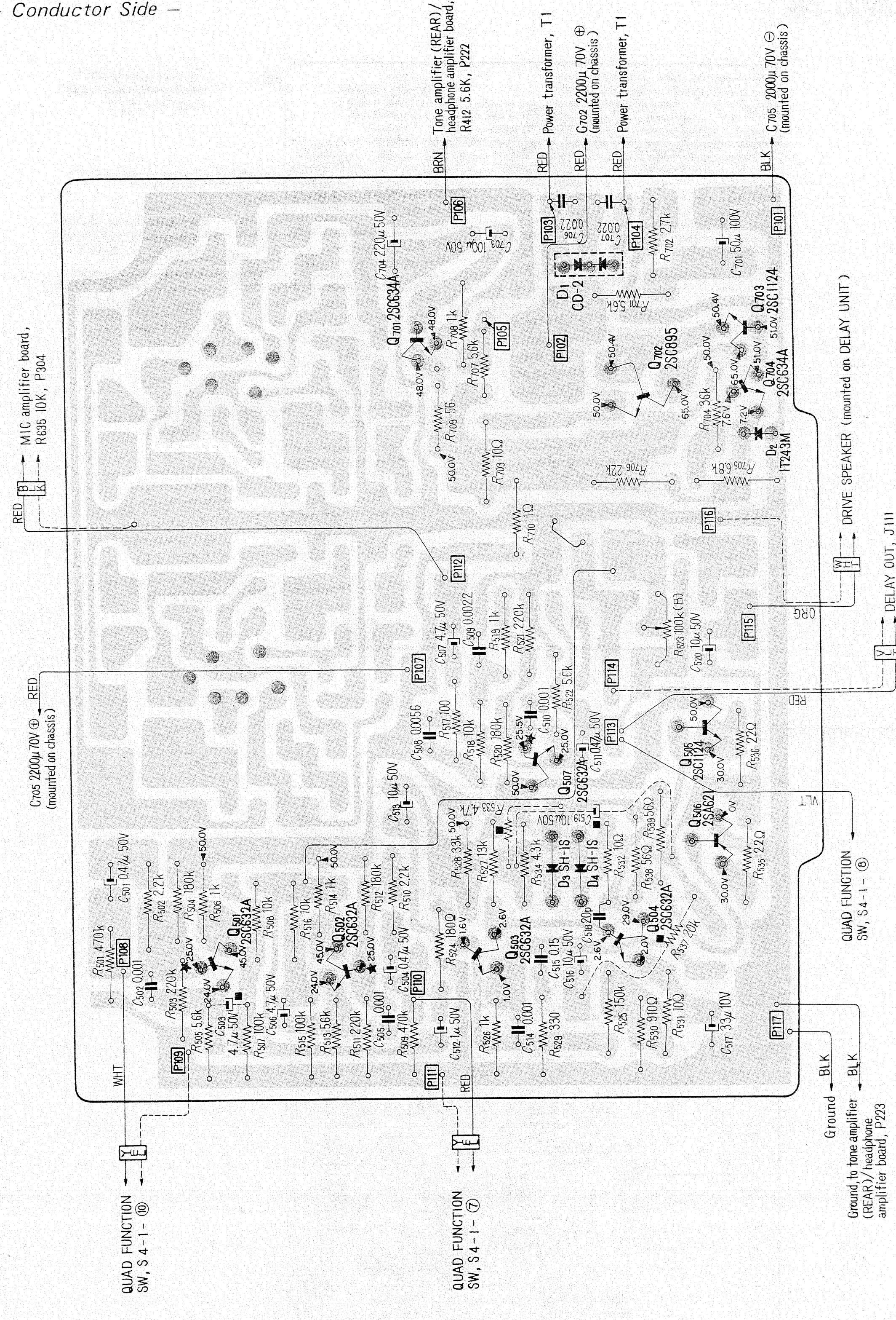

BRN
Tone amplifier (REAR)/ headphone amplifier board, R412 5.6K, P222
WHT
RED
VLT
Electret condenser MIC (ECM-1)
BLK
Tone amplifier (REAR)/head-phone amplifier board, C406 220μ6.3V ⊖ , P223
BLK
(Buffer amplifier/power amplifier)/(low pass filter/buffer amplifier)/Power supply board, C507 4.7μ50V ⊖, P112
WHT
RED
GRN
Electret condenser MIC (ECM-2)
RED
WHT
Electret condenser MIC (ECM-3)
P301
P302
P303
P304
P305
P306
P307
P308
P309
P310
P311
C614 1μ 50V
R620 5.6k
48.0V
R631 5.6k
C615 33μ 50V
R640 22k
D5 1T243M
R611 390
R612 22k
R616 3.3k
C623 220μ 16V
R630 5.6k
R625 390k
R621 390
R622 22k
R626 2k
R610 5.6k
R605 390k
R601 390
R602 22k
R606 4.7k
Q604 2SC632A
Q603 2SC631A
Q605 2SC631A
Q606 2SC632A
Q601 2SC631A
Q602 2SC632A
R633 20k(A)
R634 20k(A)
R632 20k(A)
C619 100p
C622 1μ 50V
C606 1μ 50V
C621 100μ 6.3V
C607 100μ 6.3V
C613 100μ 6.3V
C605 0.15
C604 100p
C620 0.068
C611 0.0047
C609 0.001
C617 0.001
C602 0.001
C608 0.22
C616 0.22
C601 0.22
C610 4.7μ 25V
C618 4.7μ 25V
C603 4.7μ 25V
R613 910k
R615 390k
R614 9.1k
R618 22k
R619 3.9k
R637 10k
R635 10k
R636 10k
R623 910k
R624 9.1k
R628 22k
R627 300
R629 3.9k
R603 910k
R604 9.1k
R607 560
R608 22k
R609 3.9k
30.0V
10.4V
10.0V
9.0V

— Component Side —

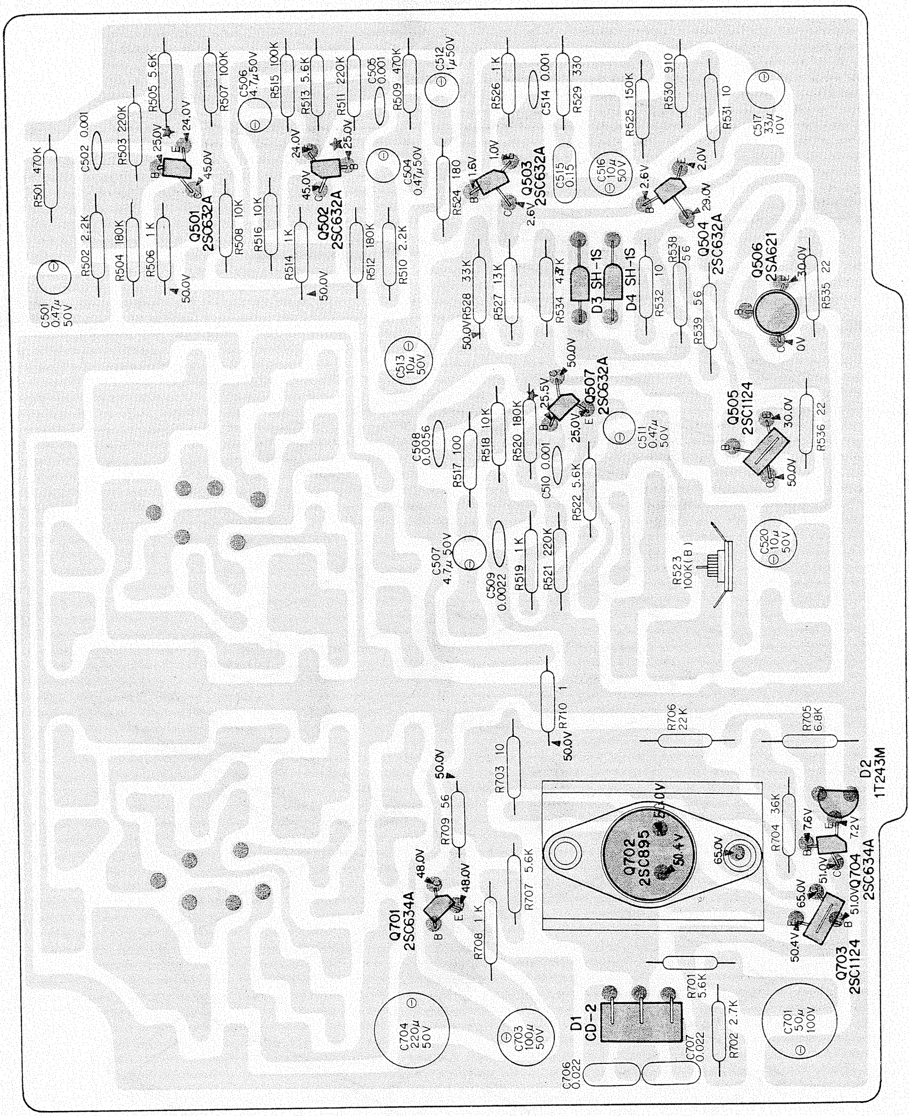

R631 56K
C608 0.22
C609 0.001
Q603 2SC631A
48.0V
R640 22K
C615 33μ 50V
R613 910K
R615 390K
R620 5.6K
C614 1μ 50V
R618 22K
R633 20K(A)
D5 1T243M
R611 390
C610 4.7μ 25V
R614 9.1K
C611 0.0047
Q604 2SC632A
C613 100μ 6.3V
R612 22K
R616 3.3K
R619 3.9K
R637 10K
C623 220μ 16V
C616 0.22
Q605 2SC631A
R623 910K
Q606 2SC632A
R635 10K
C617 0.001
C622 1μ50V
R636 10K
R634 20K(A)
R630 5.6K
R625 390K
C618 4.7μ 25V
R621 390
C620 0.068
C619 100P
R628 22K
R622 22K
R626 2K
R624 9.1K
R627 300
C621 100μ 6.3V
R629 3.9K
R610 5.6K
R605 390K
C601 0.22
Q601 2SC631A
R603 910K
C606 1μ50V
C602 0.001
C605 0.15
Q602 2SC632A
C604 100P
R608 22K
R632 20K(A)
R601 390
C603 4.7μ 25V
R604 9.1K
R607 560
R609 3.9K
C607 100μ 6.3V
R602 22K
R606 4.7K
30.0V
10.4V
10.0V
9.0V
B
C
E

4-3. Power Amplifier/Low Pass Filter-Buffer Amplifier/Power Supply Circuit Board

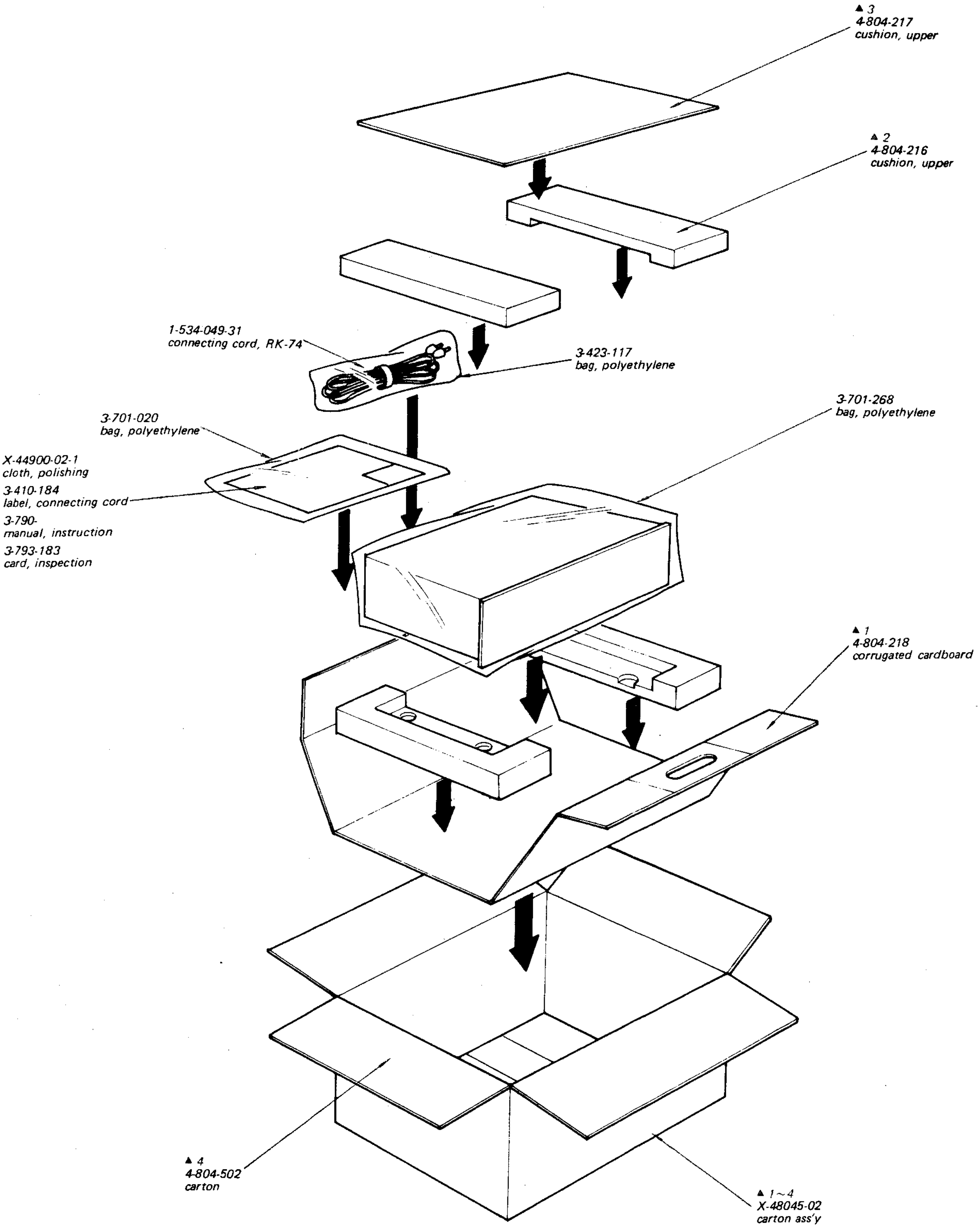
– Conductor Side –


Tone amplifier (REAR)/ headphone amplifier board, R412 5.6K, P222
BRN
Power transformer, T1
RED
C702 2200μ 70V ⊕ (mounted on chassis)
RED
Power transformer, T1
RED
C705 2000μ 70V ⊖ (mounted on chassis)
BLK
MIC amplifier board, R635 10K, P304
RED
BLK
C705 2200μ 70V ⊕ (mounted on chassis)
RED
P101
P102
P103
P104
P105
P106
P107
P108
P109
P110
P111
P112
P113
P114
P115
P116
P117
C704 220μ 50V
C703 100μ 50V
C706 0.022
C707 0.022
D1 CD-2
R702 2.7k
C701 50μ 100V
R701 5.6k
Q701 2SC634A
R708 1k
R707 5.6k
R709 56
R703 10Ω
R710 1Ω
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D2 IT243M
R704 36k
R705 6.8k
R706 22k
50.4V
50.0V
65.0V
51.0V
48.0V
7.6V
7.2V
DRIVE SPEAKER (mounted on DELAY UNIT)
WHT
DELAY OUT, J111
ORG
RED
VLT
QUAD FUNCTION SW, S4-1-⑧
C507 4.7μ 50V
C509 0.0022
R519 1k
R521 220k
R523 100k (B)
C520 10μ 50V
R522 5.6k
C510 0.001
R520 180k
R518 10k
R517 100
C508 0.0056
C511 0.47μ 50V
Q507 2SC632A
Q505 2SC1124
R536 22Ω
Q506 2SA621
R535 22Ω
C513 10μ 50V
R533 4.7k
C519 10μ 50V
R539 56Ω
R538 56Ω
R532 10Ω
D3 SH-1S
D4 SH-1S
R534 4.3k
R528 33k
R527 13k
C518 20p
Q504 2SC632A
R537 20k
Q503 2SC632A
R524 180Ω
C515 0.15
C516 10μ 50V
R525 150k
R530 910Ω
R531 10Ω
C517 33μ 10V
R526 1k
C514 0.001
R529 330
C512 1μ 50V
R501 470k
C501 0.47μ 50V
R502 2.2k
R504 180k
R506 1k
Q501 2SC632A
R508 10k
C502 0.001
R503 220k
R505 5.6k
C503 4.7μ 50V
R507 100k
C506 4.7μ 50V
R516 10k
R514 1k
Q502 2SC632A
R512 180k
R510 22k
C504 0.47μ 50V
R515 100k
R513 5.6k
R511 220k
C505 0.001
R509 470k
25.0V
24.0V
45.0V
1.6V
2.6V
1.0V
2.0V
29.0V
30.0V
25.5V
0V
WHT
RED
QUAD FUNCTION SW, S4-1-⑩
QUAD FUNCTION SW, S4-1-⑦
BLK
BLK
Ground
Ground, to tone amplifier (REAR)/headphone amplifier board, P223

—Component Side —

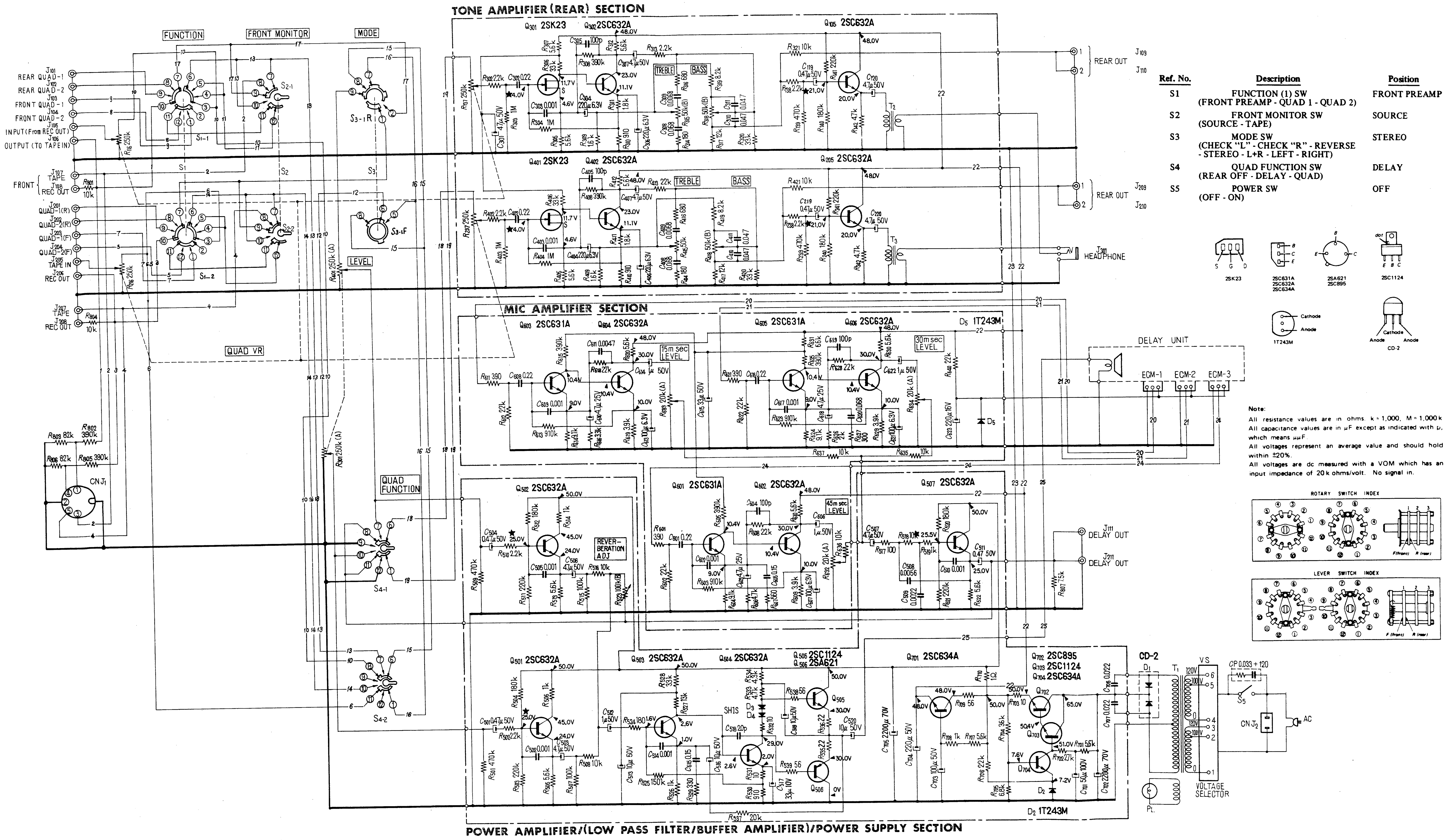

R501 470K
C502 0.001
R503 220K
R505 5.6K
R507 100K
C506 4.7µ50V
R515 100K
R513 5.6K
R511 220K
C505 0.001
R509 470K
C512 1µ50V
R526 1K
C514 0.001
R529 330
R525 150K
R530 910
R531 10
C517 33µ 10V
C501 0.47µ 50V
R502 2.2K
R504 180K
R506 1K
Q501 2SC632A
R508 10K
R516 10K
R514 1K
Q502 2SC632A
R512 180K
R510 2.2K
C504 0.47µ50V
R524 180
Q503 2SC632A
C515 0.15
C516 10µ 50V
Q504 2SC632A
R538 5.6
R528 33K
R527 13K
R534 4.7K
D3 SH-1S
D4 SH-1S
R532 10
R539 5.6
Q506 2SA621
R535 22
C513 10µ 50V
C508 0.0056
R517 100
R518 10K
R520 180K
C510 0.001
R522 5.6K
Q507 2SC632A
C511 0.47µ 50V
Q505 2SC1124
R536 22
C507 4.7µ 50V
C509 0.0022
R519 1K
R521 220K
R523 100K(B)
C520 10µ 50V
R710 1
R706 22K
R705 6.8K
R703 10
R709 56
Q702 2SC895
R704 36K
D2 1T243M
Q704 2SC634A
Q701 2SC634A
R707 5.6K
R708 1K
Q703 2SC1124
D1 CD-2
R701 5.6K
C704 220µ 50V
C703 100µ 50V
C706 0.022
C707 0.022
R702 2.7K
C701 50µ 100V
50.0V
45.0V
25.0V
24.0V
1.6V
1.0V
2.6V
29.0V
2.0V
30.0V
0V
25.5V
50.0V
48.0V
65.0V
50.4V
51.0V
7.6V
7.2V

SECTION 5
REPACKING


▲ 3
4-804-217
cushion, upper
▲ 2
4-804-216
cushion, upper
1-534-049-31
connecting cord, RK-74
3-423-117
bag, polyethylene
3-701-020
bag, polyethylene
3-701-268
bag, polyethylene
X-44900-02-1
cloth, polishing
3-410-184
label, connecting cord
3-790-
manual, instruction
3-793-183
card, inspection
▲ 1
4-804-218
corrugated cardboard
▲ 4
4-804-502
carton
▲ 1~4
X-48045-02
carton ass'y

Note: Carton ass'y includes all the parts marked ▲

SECTION 6
SCHEMATIC DIAGRAM


TONE AMPLIFIER (REAR) SECTION
MIC AMPLIFIER SECTION
POWER AMPLIFIER/(LOW PASS FILTER/BUFFER AMPLIFIER)/POWER SUPPLY SECTION
FUNCTION
FRONT MONITOR
MODE
QUAD VR
LEVEL
QUAD FUNCTION
REAR QUAD-1
REAR QUAD-2
FRONT QUAD-1
FRONT QUAD-2
INPUT (From REC OUT)
OUTPUT (TO TAPE IN)
FRONT
TAPE
REC OUT
QUAD-1(R)
QUAD-2(R)
QUAD-1(F)
QUAD-2(F)
TAPE IN
REAR OUT
HEADPHONE
DELAY UNIT
ECM-1
ECM-2
ECM-3
DELAY OUT
TREBLE
BASS
15m sec LEVEL
30m sec LEVEL
45m sec LEVEL
REVER-BERATION ADJ
CD-2
VOLTAGE SELECTOR
AC
CN J1
CN J2
Q301 2SK23
Q302 2SC632A
Q105 2SC632A
Q401 2SK23
Q402 2SC632A
Q205 2SC632A
Q603 2SC631A
Q604 2SC632A
Q605 2SC631A
Q606 2SC632A
D5 1T243M
Q502 2SC632A
Q601 2SC631A
Q602 2SC632A
Q507 2SC632A
Q501 2SC632A
Q503 2SC632A
Q504 2SC632A
Q505 2SC1124
Q506 2SA621
Q701 2SC634A
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D2 1T243M
S G D
2SK23
2SC631A
2SC632A
2SC634A
2SA621
2SC895
2SC1124
Cathode
Anode
1T243M
CD-2
ROTARY SWITCH INDEX
LEVER SWITCH INDEX
F (front)
R (rear)

Ref. No.	Description	Position
S1	FUNCTION (1) SW (FRONT PREAMP - QUAD 1 - QUAD 2)	FRONT PREAMP
S2	FRONT MONITOR SW (SOURCE - TAPE)	SOURCE
S3	MODE SW (CHECK "L" - CHECK "R" - REVERSE - STEREO - L+R - LEFT - RIGHT)	STEREO
S4	QUAD FUNCTION SW (REAR OFF - DELAY - QUAD)	DELAY
S5	POWER SW (OFF - ON)	OFF

Note:

All resistance values are in ohms. k = 1,000, M = 1,000 k

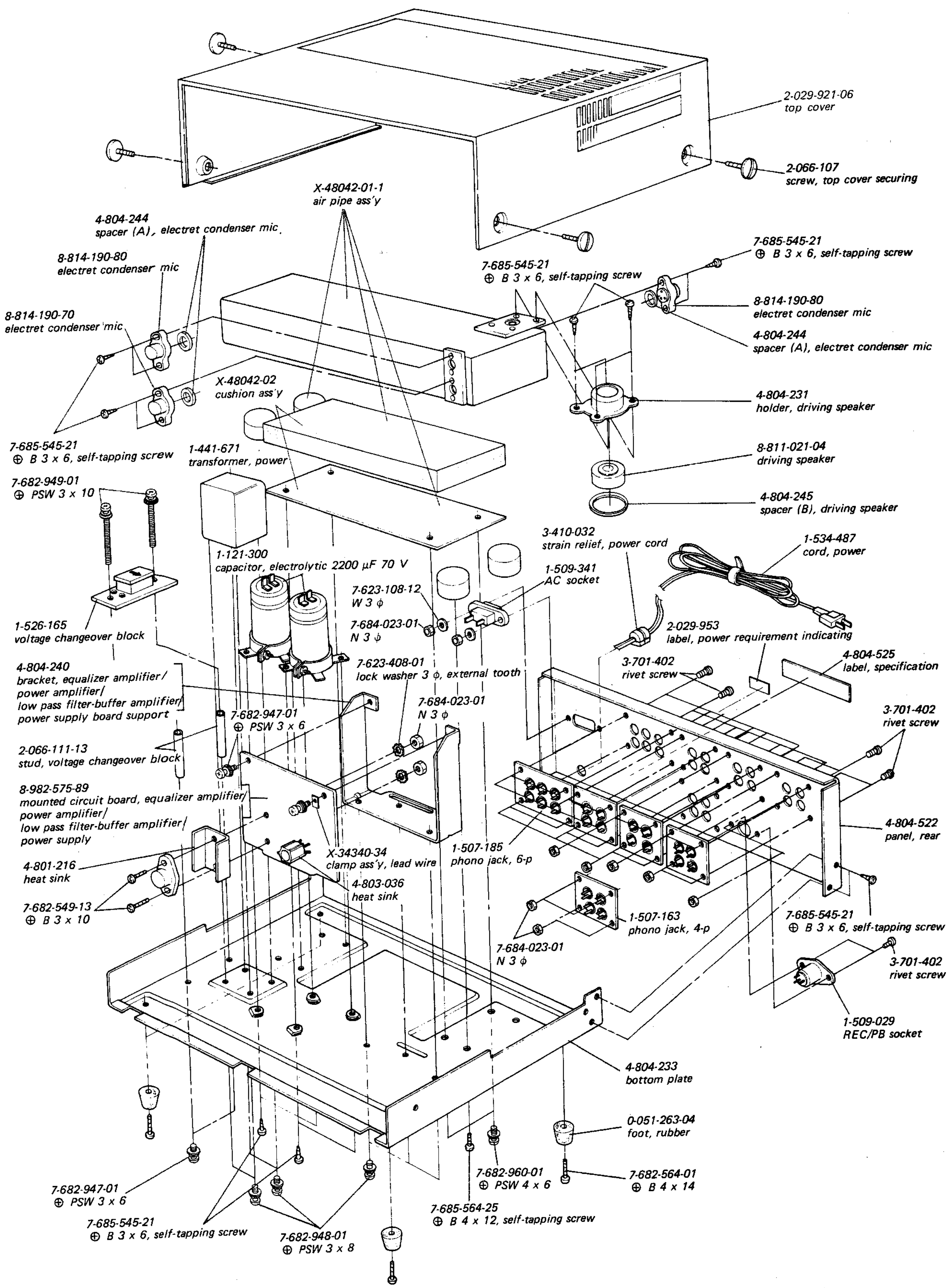
All capacitance values are in μF except as indicated with p, which means μμF.

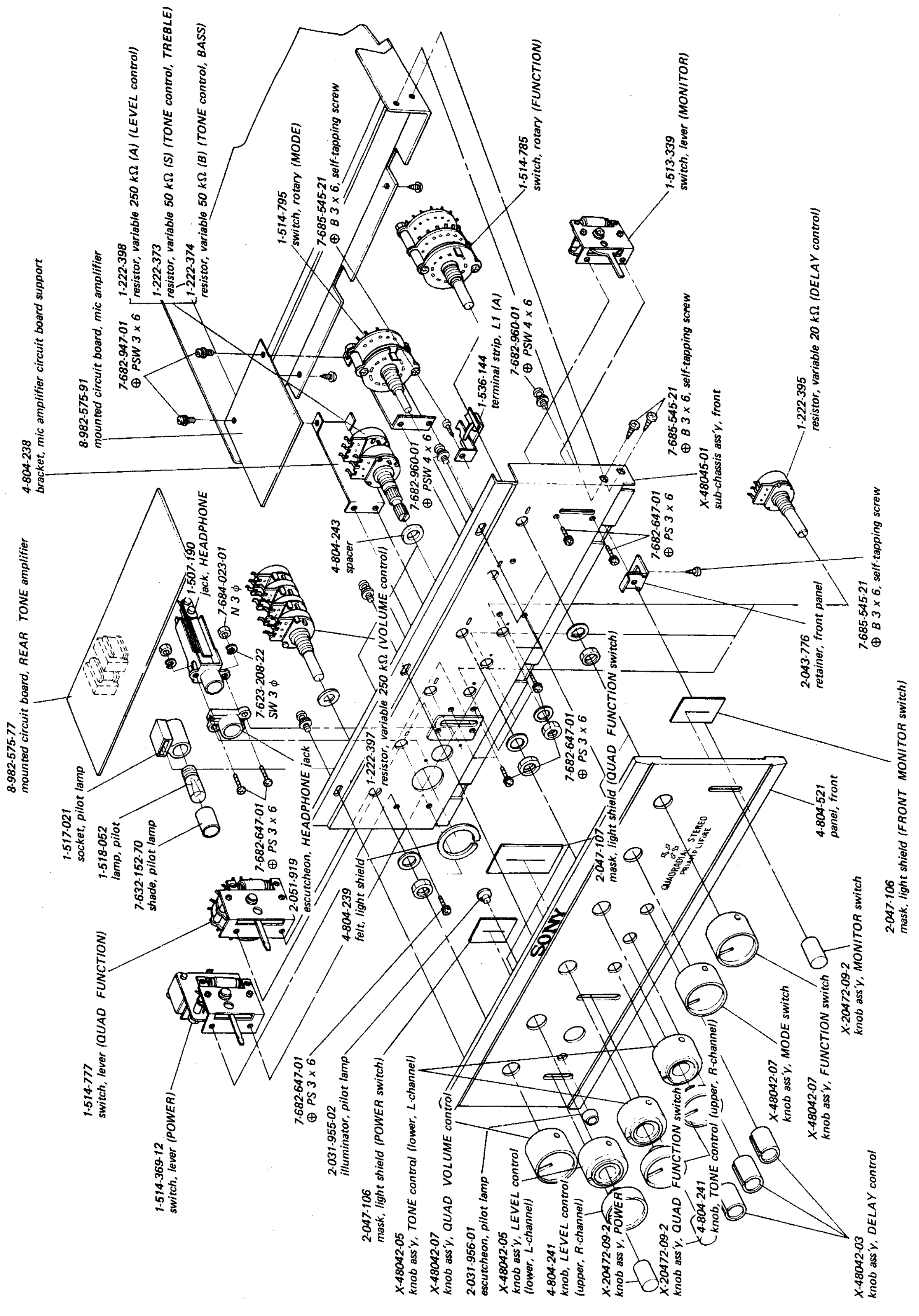
All voltages represent an average value and should hold within ±20%.

All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.

Note: ★ Measured with VTVM

SECTION 7
EXPLODED VIEW


2-029-921-06
top cover
2-066-107
screw, top cover securing
X-48042-01-1
air pipe ass'y
4-804-244
spacer (A), electret condenser mic
8-814-190-80
electret condenser mic
8-814-190-70
electret condenser mic
7-685-545-21
⊕ B 3 x 6, self-tapping screw
7-685-545-21
⊕ B 3 x 6, self-tapping screw
8-814-190-80
electret condenser mic
4-804-244
spacer (A), electret condenser mic
X-48042-02
cushion ass'y
4-804-231
holder, driving speaker
7-685-545-21
⊕ B 3 x 6, self-tapping screw
1-441-671
transformer, power
8-811-021-04
driving speaker
7-682-949-01
⊕ PSW 3 x 10
4-804-245
spacer (B), driving speaker
3-410-032
strain relief, power cord
1-534-487
cord, power
1-121-300
capacitor, electrolytic 2200 μF 70 V
1-509-341
AC socket
7-623-108-12
W 3 φ
7-684-023-01
N 3 φ
1-526-165
voltage changeover block
2-029-953
label, power requirement indicating
4-804-525
label, specification
7-623-408-01
lock washer 3 φ, external tooth
3-701-402
rivet screw
4-804-240
bracket, equalizer amplifier/
power amplifier/
low pass filter-buffer amplifier/
power supply board support
7-684-023-01
N 3 φ
3-701-402
rivet screw
7-682-947-01
⊕ PSW 3 x 6
2-066-111-13
stud, voltage changeover block
8-982-575-89
mounted circuit board, equalizer amplifier/
power amplifier/
low pass filter-buffer amplifier/
power supply
4-804-522
panel, rear
X-34340-34
clamp ass'y, lead wire
1-507-185
phono jack, 6-p
4-801-216
heat sink
4-803-036
heat sink
7-682-549-13
⊕ B 3 x 10
1-507-163
phono jack, 4-p
7-685-545-21
⊕ B 3 x 6, self-tapping screw
7-684-023-01
N 3 φ
3-701-402
rivet screw
1-509-029
REC/PB socket
4-804-233
bottom plate
0-051-263-04
foot, rubber
7-682-960-01
⊕ PSW 4 x 6
7-682-564-01
⊕ B 4 x 14
7-682-947-01
⊕ PSW 3 x 6
7-685-564-25
⊕ B 4 x 12, self-tapping screw
7-685-545-21
⊕ B 3 x 6, self-tapping screw
7-682-948-01
⊕ PSW 3 x 8


8-982-575-77
mounted circuit board, REAR TONE amplifier
4-804-238
bracket, mic amplifier circuit board support
8-982-575-91
mounted circuit board, mic amplifier
7-682-947-01
⊕ PSW 3 x 6
1-222-398
resistor, variable 250 kΩ (A) (LEVEL control)
1-222-373
resistor, variable 50 kΩ (S) (TONE control, TREBLE)
1-222-374
resistor, variable 50 kΩ (B) (TONE control, BASS)
1-517-021
socket, pilot lamp
1-518-052
lamp, pilot
7-632-152-70
shade, pilot lamp
1-507-190
jack, HEADPHONE
7-684-023-01
N 3 φ
7-623-208-22
SW 3 φ
7-682-647-01
⊕ PS 3 x 6
2-051-919
escutcheon, HEADPHONE jack
1-514-777
switch, lever (QUAD FUNCTION)
1-514-369-12
switch, lever (POWER)
1-514-795
switch, rotary (MODE)
7-685-545-21
⊕ B 3 x 6, self-tapping screw
4-804-243
spacer
1-222-397
resistor, variable 250 kΩ (VOLUME control)
4-804-239
felt, light shield
7-682-960-01
⊕ PSW 4 x 6
7-682-647-01
⊕ PS 3 x 6
2-031-955-02
illuminator, pilot lamp
2-047-106
mask, light shield (POWER switch)
X-48042-05
knob ass'y, TONE control (lower, L-channel)
X-48042-07
knob ass'y, QUAD VOLUME control
2-031-956-01
escutcheon, pilot lamp
1-514-785
switch, rotary (FUNCTION)
1-536-144
terminal strip, L1 (A)
7-682-960-01
⊕ PSW 4 x 6
X-48042-05
knob ass'y, LEVEL control
(lower, L-channel)
4-804-241
knob, LEVEL control
(upper, R-channel)
7-682-647-01
⊕ PS 3 x 6
2-047-107
mask, light shield (QUAD FUNCTION switch)
X-20472-09-2
knob ass'y, POWER
X-20472-09-2
knob ass'y, QUAD FUNCTION switch
4-804-241
knob, TONE control (upper, R-channel)
1-513-339
switch, lever (MONITOR)
7-685-545-21
⊕ B 3 x 6, self-tapping screw
X-48045-01
sub-chassis ass'y, front
7-682-647-01
⊕ PS 3 x 6
1-222-395
resistor, variable 20 kΩ (DELAY control)
2-043-776
retainer, front panel
7-685-545-21
⊕ B 3 x 6, self-tapping screw
4-804-521
panel, front
2-047-106
mask, light shield (FRONT MONITOR switch)
X-48042-07
knob ass'y, MODE switch
X-48042-07
knob ass'y, FUNCTION switch
X-20472-09-2
knob ass'y, MONITOR switch
X-48042-03
knob ass'y, DELAY control
SONY
QUADRAPHONIC STEREO

SECTION 8
ELECTRICAL PARTS LIST

MOUNTED CIRCUIT BOARDS

Ref. No.	Part No.	Description
	8-982-575-77	REAR TONE control circuit board
	8-982-575-89	power amplifier/low pass filter-buffer amplifier/power supply circuit board
	8-982-575-91	MIC amplifier circuit board

SEMICONDUCTORS

Ref. No.	Part No.	Description
D1		diode, CD2
D2		diode, 1T243M
D3		diode, SH1S
D4		diode, SH1S
D5		diode, 1T243M
Q105(Q205)		transistor, 2SC632A
Q301(Q401)		FET, 2SK23
Q302(Q402)		transistor, 2SC632A
Q501		transistor, 2SC632A
Q502		transistor, 2SC632A
Q503		transistor, 2SC632A
Q504		transistor, 2SC632A
Q505		transistor, 2SC1124
Q506		transistor, 2SA621
Q507		transistor, 2SC632A
Q601		transistor, 2SC631A
Q602		transistor, 2SC632A
Q603		transistor, 2SC631A
Q604		transistor, 2SC632A
Q605		transistor, 2SC631A
Q606		transistor, 2SC632A
Q701		transistor, 2SC634A
Q702		transistor, 2SC895
Q703		transistor, 2SC1124
Q704		transistor, 2SC634A

TRANSFORMERS

Ref. No.	Part No.	Description
T1	1-441-671	transformer, power
T2	1-427-217	transformer, output
T3	1-427-217	transformer, output

CAPACITORS

All capacitance values are in μF except as indicated with p, which means $\mu\mu$F.

Ref. No.	Part No.	Description			
C119(C219)	1-121-726	0.47	$\pm^{150}_{10}\%$	50V	electrolytic
C120(C220)	1-121-396	4.7	$\pm^{100}_{10}\%$	50V	electrolytic
C301	1-121-411	47	$\pm^{100}_{10}\%$	50V	electrolytic
C302(C402)	1-105-849-12	0.22	±20%	50V	mylar
C303(C403)	1-105-821-12	0.001	±20%	50V	mylar
C304(C404)	1-121-420	220	$\pm^{100}_{10}\%$	10V	electrolytic
C305(C405)	1-107-131	100p	±10%	50V	mica
C306(C406)	1-121-420	220	$\pm^{100}_{10}\%$	10V	electrolytic
C307(C407)	1-121-396	4.7	$\pm^{100}_{10}\%$	50V	electrolytic
C308(C408)	1-105-683-12	0.068	±10%	50V	mylar
C309(C409)	1-105-671-12	0.0068	±10%	50V	mylar
C310(C410)	1-105-681-12	0.047	±10%	50V	mylar
C311(C411)	1-105-681-12	0.047	±10%	50V	mylar
C501	1-121-911	0.47	$\pm^{100}_{10}\%$	50V	electrolytic
C502	1-105-821-12	0.001	±20%	50V	mylar
C503	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C504	1-121-911	0.47	$\pm^{100}_{10}\%$	50V	electrolytic
C505	1-105-821-12	0.001	±20%	50V	mylar
C506	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C507	1-121-396	4.7	$\pm^{150}_{10}\%$	50V	electrolytic
C508	1-105-510-12	0.0056	±5%	50V	mylar
C509	1-105-505-12	0.0022	±10%	50V	mylar
C510	1-105-821-12	0.001	±20%	50V	mylar
C511	1-121-726	0.47	$\pm^{150}_{10}\%$	50V	electrolytic
C512	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C513	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C514	1-105-821-12	0.001	±20%	50V	mylar
C515	1-105-687-12	0.15	±10%	50V	mylar
C516	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C517	1-121-402	33	$\pm^{100}_{10}\%$	10V	electrolytic
C518	1-107-114	20p	±5%	50V	mica
C519	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C520	1-121-738	10	$\pm^{100}_{10}\%$	50V	electrolytic
C601	1-105-849-12	0.22	±20%	50V	mylar
C602	1-105-821-12	0.001	±20%	50V	mylar
C603	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C604	1-107-131	100p	±10%	50V	mica
C605	1-105-687-12	0.15	±10%	50V	mylar
C606	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C607	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C608	1-105-849-12	0.22	±20%	50V	mylar
C609	1-105-821-12	0.001	±20%	50V	mylar
C610	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C611	1-105-669-12	0.0047	±10%	50V	mylar
C613	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C614	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C615	1-121-405	33	$\pm^{100}_{10}\%$	50V	electrolytic
C616	1-105-849-12	0.22	±20%	50V	mylar
C617	1-105-821-12	0.001	±20%	50V	mylar
C618	1-121-395	4.7	$\pm^{150}_{10}\%$	25V	electrolytic
C619	1-107-131	100p	±10%	50V	mica
C620	1-105-683-12	0.068	±10%	50V	mylar
C621	1-121-413	100	$\pm^{100}_{10}\%$	6.3V	electrolytic
C622	1-121-391	1	$\pm^{150}_{10}\%$	50V	electrolytic
C623	1-121-421	220	$\pm^{100}_{10}\%$	16V	electrolytic

Ref. No.	*Part No.*	*Description*			
C701	1-121-559	50	$\pm^{100}_{10}$%	100V	electrolytic
C702	1-121-300	2,200	$\pm^{100}_{10}$%	70V	electrolytic
C703	1-121-417	100	$\pm^{100}_{10}$%	50V	electrolytic
C704	1-121-423	220	$\pm^{100}_{10}$%	50V	electrolytic
C705	1-121-300	2,200	$\pm^{100}_{10}$%	70V	electrolytic
C706	1-105-917-12	0.022	±20%	200V	mylar
C707	1-105-917-12	0.022	±20%	200V	mylar

RESISTORS

All resistance values are in ohms, ±5%, ¼W and carbon type, unless otherwise indicated.

Ref. No.	*Part No.*	*Description*		
R116(R216)	1-222-397	250k, variable		(VOLUME control)
R137(R237)	1-222-397	250k, variable		(VOLUME control)
R138(R238)	1-242-681-31	2.2k	±10%	
R139(R239)	1-242-737-31	470k	±10%	
R140(R240)	1-242-727-31	180k	±10%	
R141(R241)	1-242-729-31	220k	±10%	
R142(R242)	1-242-689-31	4.7k	±10%	
R301(R401)	1-222-398	250k(A/A), variable		(REAR LEVEL control)
R302(R402)	1-242-681-31	2.2k	±10%	
R303(R403)	1-242-745-31	1M	±10%	
R304(R404)	1-242-745	1M		
R305(R405)	1-242-691	5.6k		
R306(R406)	1-242-709	33k		
R307	1-242-691-31	5.6k	±10%	
R308(R408)	1-242-735	390k		
R309(R409)	1-242-677	1.6k		
R310(R410)	1-242-672	910		
R311(R411)	1-242-679	1.8k		
R312(R412)	1-242-691-31	5.6k	±10%	
R313(R413)	1-242-681-31	2.2k	±10%	
R314(R414)	1-242-655	180		
R315(R415)	1-222-373	50k(S), variable		(REAR TONE control, TREBLE)
R316(R416)	1-242-669	680		
R317(R417)	1-242-699	12k		
R318(R418)	1-222-374	50k(B), variable		(REAR TONE control, BASS)
R319(R419)	1-242-695	8.2k		
R320(R420)	1-242-709	33k		
R321(R421)	1-242-697	10k		
R501	1-244-737-31	470k	±10%	
R502	1-244-681-31	2.2k	±10%	
R503	1-244-729	220k		
R504	1-244-727	180k		
R505	1-244-691-31	5.6k	±10%	
R506	1-244-673-31	1k	±10%	
R507	1-244-721-31	100k	±10%	
R508	1-244-697-31	10k	±10%	
R509	1-244-737-31	470k	±10%	
R510	1-244-681-31	2.2k	±10%	
R511	1-244-729	220k		
R512	1-244-727	180k		
R513	1-244-691-31	5.6k	±10%	
R514	1-244-673-31	1k	±10%	
R515	1-244-721-31	100k	±10%	
R516	1-244-697-31	10k	±10%	
R517	1-244-649-31	100	±10%	
R518	1-244-697-31	10k	±10%	
R519	1-244-673	1k		
R520	1-244-727-31	180k	±10%	
R521	1-244-729-31	220k	±10%	
R522	1-244-691-31	5.6k	±10%	
R523	1-222-987	100k(B)	±3%	semi-fixed
R524	1-244-655-31	180	±10%	
R525	1-244-725	150k		
R526	1-244-673	1k		
R527	1-244-700	13k		
R528	1-244-709-31	33k	±10%	
R529	1-244-661	330		
R530	1-244-672	910		
R531	1-244-625	10		
R532	1-244-625	10		
R533	1-244-689-31	4.7k	±10%	
R534	1-244-688-31	4.3k	±10%	
R535	1-244-633	22		
R536	1-244-633	22		
R537	1-244-704	20k		
R538	1-244-643-31	56		
R539	1-244-643-31	56		
R601	1-242-663-31	390	±10%	
R602	1-242-705-31	22k	±10%	
R603	1-242-744	910k		
R604	1-242-696	9.1k		
R605	1-242-735	390k		
R606	1-242-689	4.7k		
R607	1-242-667	560		
R608	1-242-705	22k		
R609	1-242-687	3.9k		
R610	1-242-691-31	5.6k	±10%	
R611	1-242-663-31	390	±10%	
R612	1-242-705-31	22k	±10%	
R613	1-242-744	910k		
R614	1-242-696	9.1k		
R615	1-242-735	390k		
R616	1-242-685	3.3k		
R618	1-242-705	22k		
R619	1-242-687	3.9k		
R620	1-242-691-31	5.6k	±10%	
R621	1-242-663-31	390	±10%	
R622	1-242-705-31	22k	±10%	

Ref. No.	Part No.	Description		
R623	1-242-744	910k	±10%	
R624	1-242-696	9.1k		
R625	1-242-735	390k		
R626	1-242-680	2k		
R627	1-242-660	300		
R628	1-242-705	22k		
R629	1-242-687	3.9k		
R630	1-242-691-31	5.6k	±10%	
R631	1-242-715-31	56k	±10%	
R632	1-222-395	20k(A), variable		(DELAY control)
R633	1-222-395	20k(A), variable		(DELAY control)
R634	1-222-395	20k(A), variable		(DELAY control)
R635	1-242-697-31	10k	±10%	
R636	1-242-697-31	10k	±10%	
R637	1-242-697-31	10k	±10%	
R640	1-242-705-31	22k	±10%	
R701	1-244-691-31	5.6k	±10%	
R702	1-244-683-31	2.7k	±10%	
R703	1-244-625-31	10	±10%	
R704	1-244-710	36k		
R705	1-244-693	6.8k		
R706	1-244-705-31	22k	±10%	
R707	1-244-691-31	5.6k	±10%	
R708	1-244-673-31	1k	±10%	
R709	1-244-643-31	56	±10%	
R710	1-244-601-31	1	±10%	
R801	1-244-697-31	10k	±10%	
R802	1-244-735-31	390k	±10%	

Ref. No.	Part No.	Description	
R803	1-244-719-31	82k	±10%
R804	1-244-697-31	10k	±10%
R805	1-244-735-31	390k	±10%
R806	1-244-719-31	82k	±10%
R807	1-244-694	7.5k	

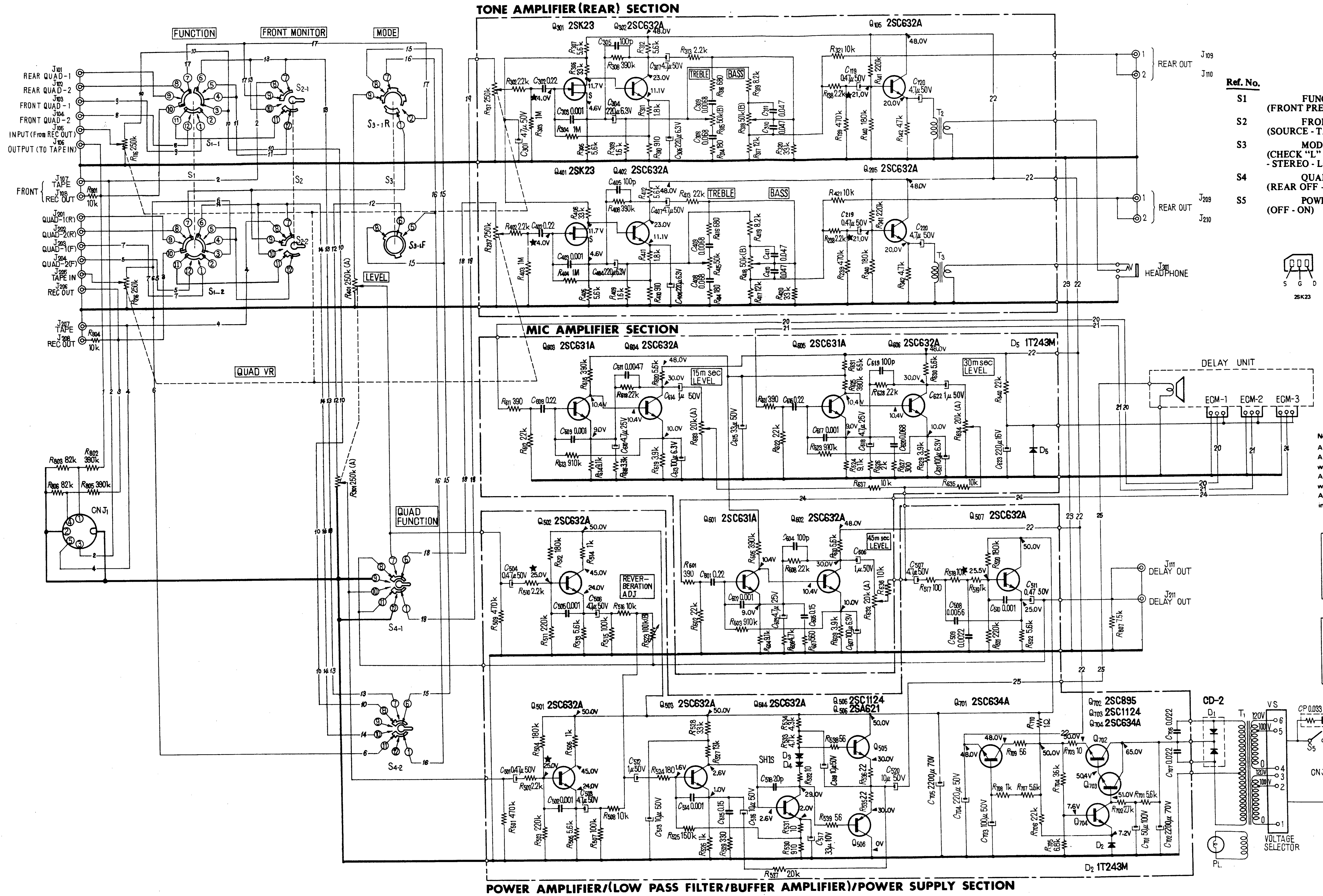
SWITCHES

S1	1-514-785	switch, rotary	(FUNCTION)
S2	1-513-339	switch, lever	(MONITOR)
S3	1-514-795	switch, rotary	(MODE)
S4	1-514-777	switch, lever	(QUAD FUNCTION)
S5	1-514-369-12	switch, lever	(POWER)

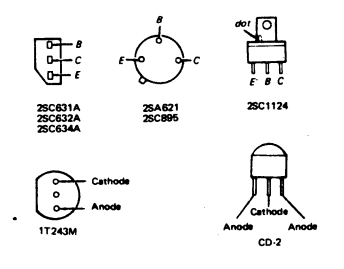
MISCELLANEOUS

	1-231-057-12	encapsulated component, 120Ω+0.033μF
	1-507-163	phono jack, 4-p
	1-507-185	phono jack, 6-p
	1-507-190-12	jack, HEADPHONE
	1-509-029	REC/PB socket
	1-509-341	AC socket
	1-517-021	socket, pilot lamp
	1-518-052	lamp, pilot
	1-526-165	voltage changeover block
	1-534-487-22	cord, power
	1-536-144	terminal strip, L1(A)
	1-536-179	terminal strip, 1L1(C)
	8-811-021-04	driving speaker
ECM 1, 2	8-814-190-80	electret condenser mic
ECM 3	8-814-190-70	electret condenser mic

SCHEMATIC DIAGRAM


TONE AMPLIFIER (REAR) SECTION
MIC AMPLIFIER SECTION
POWER AMPLIFIER/(LOW PASS FILTER/BUFFER AMPLIFIER)/POWER SUPPLY SECTION
FUNCTION
FRONT MONITOR
MODE
LEVEL
QUAD VR
QUAD FUNCTION
REAR QUAD-1
REAR QUAD-2
FRONT QUAD-1
FRONT QUAD-2
INPUT (From REC OUT)
OUTPUT (TO TAPE IN)
FRONT TAPE
REC OUT
QUAD-1(R)
QUAD-2(R)
QUAD-1(F)
QUAD-2(F)
TAPE IN
REC OUT
CN J1
REAR OUT
HEADPHONE
DELAY UNIT
ECM-1
ECM-2
ECM-3
DELAY OUT
TREBLE
BASS
15m sec LEVEL
30m sec LEVEL
45m sec LEVEL
REVERBERATION ADJ
CD-2
VOLTAGE SELECTOR
CN J2
AC
PL
Q301 2SK23
Q302 2SC632A
Q105 2SC632A
Q401 2SK23
Q402 2SC632A
Q205 2SC632A
Q603 2SC631A
Q604 2SC632A
Q605 2SC631A
Q606 2SC632A
D5 1T243M
Q502 2SC632A
Q601 2SC631A
Q602 2SC632A
Q507 2SC632A
Q501 2SC632A
Q503 2SC632A
Q504 2SC632A
Q505 2SC1124
Q506 2SA621
Q701 2SC634A
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D2 1T243M
2SK23

Ref. No.	Description	Position
S1	FUNCTION (1) SW (FRONT PREAMP - QUAD 1 - QUAD 2)	FRONT PREAMP
S2	FRONT MONITOR SW (SOURCE - TAPE)	SOURCE
S3	MODE SW (CHECK “L” - CHECK “R” - REVERSE - STEREO - L+R - LEFT - RIGHT)	STEREO
S4	QUAD FUNCTION SW (REAR OFF - DELAY - QUAD)	DELAY
S5	POWER SW (OFF - ON)	OFF


B
C
E
2SC631A
2SC632A
2SC634A
2SA621
2SC895
dot
2SC1124
Cathode
Anode
1T243M
CD-2

Note:

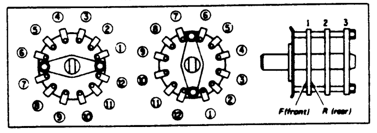
All resistance values are in ohms. k = 1,000, M = 1,000 k

All capacitance values are in μF except as indicated with p, which means $\mu\mu$F.

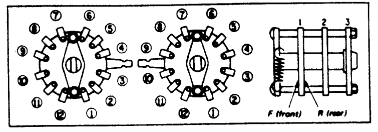
All voltages represent an average value and should hold within ±20%.

All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.

ROTARY SWITCH INDEX


F (front)
R (rear)

LEVER SWITCH INDEX


F (front)
R (rear)

Note: Measured with VTVM

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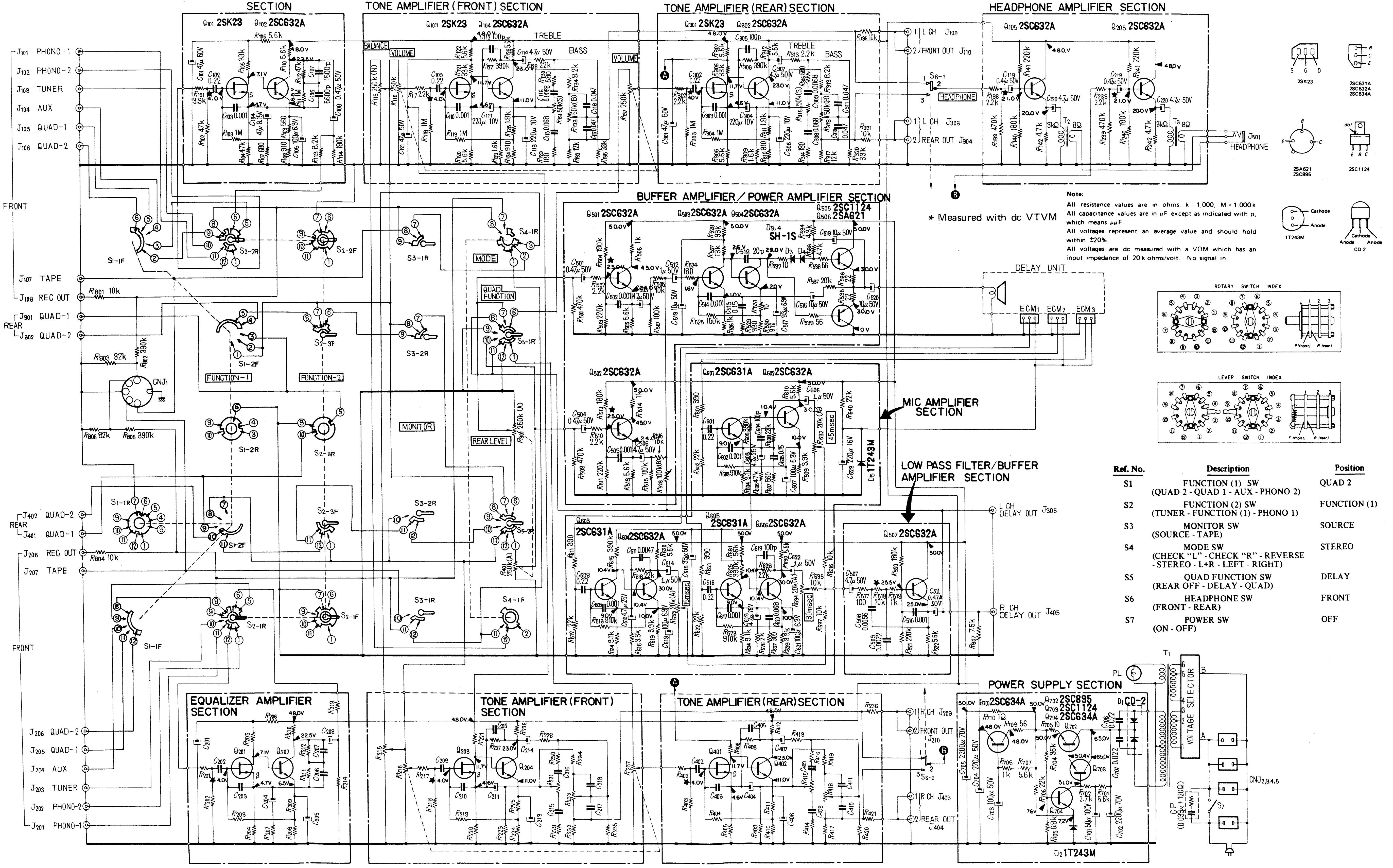
SCHEMATIC DIAGRAM


EQUALIZER AMPLIFIER SECTION
TONE AMPLIFIER (FRONT) SECTION
TONE AMPLIFIER (REAR) SECTION
HEADPHONE AMPLIFIER SECTION
BUFFER AMPLIFIER / POWER AMPLIFIER SECTION
MIC AMPLIFIER SECTION
LOW PASS FILTER/BUFFER AMPLIFIER SECTION
POWER SUPPLY SECTION
DELAY UNIT
ECM1
ECM2
ECM3
Q101 2SK23
Q102 2SC632A
Q103 2SK23
Q104 2SC632A
Q301 2SK23
Q302 2SC632A
Q105 2SC632A
Q205 2SC632A
Q501 2SC632A
Q503 2SC632A
Q504 2SC632A
Q505 2SC1124
Q506 2SA621
D3, 4 SH-1S
Q502 2SC632A
Q601 2SC631A
Q602 2SC632A
D5 1T243M
Q603 2SC631A
Q604 2SC632A
Q605 2SC631A
Q606 2SC632A
Q507 2SC632A
Q701 2SC634A
Q702 2SC895
Q703 2SC1124
Q704 2SC634A
D1 CD-2
D2 1T243M
VOLTAGE SELECTOR
J101 PHONO-1
J102 PHONO-2
J103 TUNER
J104 AUX
J105 QUAD-1
J106 QUAD-2
FRONT
J107 TAPE
J108 REC OUT
J301 QUAD-1
J302 QUAD-2
REAR
J402 QUAD-2
J401 QUAD-1
J208 REC OUT
J207 TAPE
J206 QUAD-2
J205 QUAD-1
J204 AUX
J203 TUNER
J202 PHONO-2
J201 PHONO-1
BALANCE
VOLUME
TREBLE
BASS
MODE
QUAD FUNCTION
FUNCTION-1
FUNCTION-2
MONITOR
REAR LEVEL
CNJ1
1 L CH J109
2 FRONT OUT J110
HEADPHONE
1 L CH J303
2 REAR OUT J304
J501 HEADPHONE
L CH DELAY OUT J305
R CH DELAY OUT J405
1 R CH J209
2 FRONT OUT J210
1 R CH J403
2 REAR OUT J404
CNJ2,3,4,5
PL
T1
S7
45msec
15msec
30msec
2SK23
2SC631A
2SC632A
2SC634A
2SA621
2SC895
2SC1124
1T243M
Cathode
Anode
CD-2
ROTARY SWITCH INDEX
LEVER SWITCH INDEX
F (front)
R (rear)

★ Measured with dc VTVM

Note:

All resistance values are in ohms. k = 1,000, M = 1,000k

All capacitance values are in μF except as indicated with p, which means μμF.

All voltages represent an average value and should hold within ±20%.

All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.

Ref. No.	Description	Position
S1	FUNCTION (1) SW (QUAD 2 - QUAD 1 - AUX - PHONO 2)	QUAD 2
S2	FUNCTION (2) SW (TUNER - FUNCTION (1) - PHONO 1)	FUNCTION (1)
S3	MONITOR SW (SOURCE - TAPE)	SOURCE
S4	MODE SW (CHECK "L" - CHECK "R" - REVERSE - STEREO - L+R - LEFT - RIGHT)	STEREO
S5	QUAD FUNCTION SW (REAR OFF - DELAY - QUAD)	DELAY
S6	HEADPHONE SW (FRONT - REAR)	FRONT
S7	POWER SW (ON - OFF)	OFF

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